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Railway Revenues and Costs

THE weekly traffic returns for the fifty-second week of 1937 showed that the four main-line railway companies had a gross revenue of £164,062,000, which was £7,106,000 or 4½ per cent. more than in the similar period of 1936. While this is a very satisfactory tendency, it has been realised for some time that substantial rises in working costs must have absorbed much of the increase in gross revenues, although precise information on the subject has naturally not been available so far. It was particularly valuable therefore that last week, Sir William Wood, Vice-President, Finance and Service Departments, L.M.S.R., should have sounded a timely note of caution in an interview to *The Financial Times* of which we publish the essence on page 87. Sir William was, of course, surveying the position of his own company alone, and it must not be assumed that the other three companies have been affected to the same extent although they must all have been influenced in broadly the same way. Some of the factors in the rise in working costs, such as wage increases and higher commodity prices, should have been obvious to all, although their effect in 1937 is unknown. Other factors mentioned by Sir William were not so generally appreciated. For example, the slowing up in the rate of increase in certain classes of traffic during the nine weeks prior to the increase in charges on October 1 last, gave an indication of a less happy tendency towards the carriage of additional quantities of the higher-rated goods which will limit the expansion in receipts. Sir William foresees broadly a continuance this year of the experience of the last quarter of 1937 and shows that the rise in expenditure chargeable against revenue has operated with greater effect than was known last June. From traffic results he sees no indication of a trade slump, but thinks it improbable that 1938 will reach the 1929 level of receipts, although the last four weeks of 1937 exceeded the 1929 level.

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The Bristol District, L.M.S.R.

With 50 per cent. of the national banana imports, 25 per cent. of the tobacco, and 10 per cent. of the grain unloaded on their doorstep, the L.M.S.R. District Goods & Passenger Manager at Bristol (Mr. G. S. Rider) and his staff have a considerable field for their enterprise. Into the district also come grain, timber, and iron at Sharpness; and more timber at Gloucester; while traffic in tin plates and coal passes outwards through Lydney docks. Mr. Rider also acts on behalf of the L.M.S.R. and the Southern Railway for the Somerset & Dorset Joint Railway, which has its own imports of timber and roadstone through Highbridge. Until a few years ago, indeed, Mr. Rider was, as *Quota News* expresses it, "Admiral" of the S. & D. fleet, consisting of two steamers bringing various commodities from South Wales and elsewhere to Highbridge for dispatch over the S. & D. joint line to the Southern Railway. One vessel has since been scrapped, and the other sold. The same article in *Quota News* shows that the mileage in the Bristol District totals nearly 300, for there are 145 miles of branch line depending upon the 150 miles of main route from Blackwell (near Birmingham) to Bristol, and south over the S. & D. to Broadstone Junction (for Bournemouth) which forms the "spinal column" of the district. Bristol obtained 99·29 per cent. of its passenger quota; 96·37 per cent. in goods; and 97·13 per cent. in coal during the January—October period of 1937.

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The Weeks' Traffics

For the first week's working of 1938 a combined total increase of £83,000 is shown by the four main-line companies as compared with the opening week of last year. To this the L.M.S.R. contributed £42,000, the L.N.E.R. £18,000, the G.W.R. £15,000, and the Southern Railway £8,000 on total takings of £1,132,000, £813,000, £477,000, and £344,000 respectively. Passenger traffics showed a combined increase of £44,000, goods and merchandise a decrease of £9,500, and coal an increase of £48,500.

	1st Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec	
	£	£	£	£	£	%
L.M.S.R.	+ 17,000	+ 1,000	+ 24,000	+ 42,000	+ 42,000	+ 3·85
L.N.E.R.	+ 13,000	− 13,000	+ 18,000	+ 18,000	+ 18,000	+ 2·26
G.W.R.	+ 3,000	+ 6,000	+ 6,000	+ 15,000	+ 15,000	+ 3·25
S.R.	+ 11,000	− 3,500	+ 500	+ 8,000	+ 8,000	+ 2·38

Mersey Railway receipts to date total £4,775, an increase of £77. Great Northern (I.) total traffics at £15,000 show a decrease of £300, a passenger increase of £600 being offset by a goods decrease of £900. Great Southern total traffics at £74,766 show an increase of £3,386—goods £2,874 and passengers £512.

* * * *

Pullman Car Results

The report for the year ended September 30, 1937, shows gross receipts £295,216, an increase of 8·96 per cent. Working expenses were £213,465, that is, 7·92 per cent. more, making net receipts, at £81,750, higher by 11·78 per cent. Adding interest, transfer fees, &c., to the operating profit, brings the net revenue up to

£87,258, from which is deducted final interest due on electric cars, £515, interest on 4½ per cent. debenture stock, £4,500, and superannuation fund, £500, making £81,743, to which is added the balance brought forward from 1936, less dividend of 3 per cent., less tax, on preference capital on account of arrears, £11,297. Deducting also £787 for provision for depreciation of buildings, machinery, &c., and £500 for depreciation of investments, the balance remaining is £103,296, and this it is proposed to carry forward in view of the scheme for the reorganisation of capital, particulars of which were recorded in last week's issue of THE RAILWAY GAZETTE at page 36.

	1936-37	1935-36
	£	£
Gross receipts	295,216	270,935
Working expenses	213,465	197,798
Net receipts	81,750	73,137

The number of passengers carried in the company's cars was 1,241,135, an increase of 4·91 per cent. The company now owns 222 cars. The Continental services showed an improvement on last year, 113,614 passengers being carried as against 92,711 in the year before. This however is still a long way behind the year 1929, when 259,925 passengers were carried on the Continental services.

* * * *

Overseas Railway Traffics

At the end of the 52nd week, Canadian Pacific earnings showed an increase for the whole year of £1,304,400, reaching a total of £29,017,000. The increase in that week was £17,200. Receipts of four Argentine railways have declined during the fortnight under review, the Buenos Ayres & Pacific losing £28,163, the Buenos Ayres Great Southern £20,719, the Buenos Ayres Western £34,429, and the Central Argentine £68,337. On the other hand the Argentine North Eastern has recorded increases in both weeks amounting to £2,481, and has secured an improvement of £12,472 in the 28 weeks of the financial year.

	No. of Week	Weekly Traffics	Inc. or Decrease	Aggregate Traffic	Inc. or Decrease
		£	£	£	£
Buenos Ayres & Pacific ..	28th	83,809	— 16,811	2,224,258	+ 2,814
Buenos Ayres Great Southern ..	28th	186,228	— 13,834	3,591,439	+ 213,443
Buenos Ayres Western	28th	42,680	— 19,975	1,269,852	+ 40,054
Central Argentine	28th	111,517	— 47,100	3,538,704	— 405,247
Canadian Pacific	1st	457,600	+ 9,000	—	—
Bombay, Baroda & Central India	39th	278,325	— 49,725	6,532,125	+ 231,925

For the first 8 days of 1938 the receipts of the Great Western of Brazil Railway showed a decrease of £1,800 compared with 1937.

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Results of Wedgwood and Pope Recommendations

After a preliminary consideration of the report of the Wedgwood Committee, the Indian Railway Board sought the opinions of the various railway administrations concerning its recommendations, and appointed two officers who were placed on special duty to study them and co-ordinate the replies from the railways. The two officers were Mr. C. G. W. Gordon, to deal with the various traffic problems involved, and Mr. R. C. Case, to consider the committee's views on the mechanical side of railway working. The opinions of the railways have now been received by the board and are being considered side by side with the views of the two special officers. Already, however, it has been decided to strengthen the "organisation" branches of the railways, set up to carry out the Pope Economy Committee recommendations, and a special personnel is being appointed to follow up the additional points made in the Wedgwood report referring to this particular subject. It is significant that, according to figures communicated to the press in India, a sum of over Rs. 1 crore (£¾ million) has already been saved as a result of the Pope economy campaign, and in addition, on one item alone, locomotive stock, capital will have been reduced by some Rs. 3 crores (£2¼ million) by April, 1939, as compared with 1929.

* * * *

Increased Efficiency Drive in India

As a single instance of the locomotive economies effected by Pope economy methods—better locomotive user—a 10 per cent. increase in the average passenger engine-miles a day, per passenger engine in use, has been secured, taking an average of the percentages on the four State-worked lines between 1933 and 1936. So marked is the all-round improvement in this and similar respects that in 15 months' time there will probably be 461 fewer locomotives on these four systems than in 1934, and 612 fewer than in 1929, though the hauling capacity of the locomotive stock will be as great or greater. It is the reduction of 612 engines that represents a saving of Rs. 3 crores capital. Similarly there should be a drop in the number of coaches in use within the five-year period ending March, 1939, by the equivalent of 865 four-wheel units. In fact, the Railway Board is concentrating upon both increased user of all stock and more detailed scrutiny of new rolling stock programmes. For instance, the purchase of new locomotives is now sanctioned only when the board is satisfied that everything possible has been done to make the utmost of existing engines. At the same time, proposals for the reduction of obsolete stock are duly considered, and to increase the efficiency of the wagon stock, reconditioning on a large scale has been put in hand on some lines. Plans have also been prepared for the more intensive use of workshop machinery and plant, though the latest production methods have been in force in many shops for some years past.

* * * *

The Midland Railway in the West Riding

One of the major railway schemes of comparatively recent years that failed to come to full fruition is recalled by the removal of the track of the one-time Midland branch from Mirfield to Red Doles junction, Huddersfield. This line formed part of a Midland project to put the city of Bradford on a main line to Scotland, as well as to give direct Midland access to Huddersfield, and Dewsbury. The first stage was the construction of the spur from Royston junction, on the main St. Pancras—Leeds line, to Thornhill, on the then Lancashire & Yorkshire main line from Wakefield to Manchester; from this spur a branch was thrown off to Dewsbury, and to reach Huddersfield without any use of London & North Western metals the branch from Mirfield (involving the use of L. & Y. tracks from Thornhill to Mirfield) was built to an extensive site cleared for the purpose at Newtown, Huddersfield. Nothing more than a goods yard was ever laid out here, however, to which access is now obtained directly from Red Doles junction, on the Huddersfield—Leeds line, the costly section from Mirfield, which includes two viaducts of considerable size, having thus been abandoned. The Bradford plan consisted of a short line from Low Moor, L. & Y.R., largely in tunnel, joining the Midland Bradford—Shipley branch outside Bradford (Market Street) station; this would have permitted through running from St. Pancras to Scotland via Royston, Thornhill, Bradford, and Shipley, with the use of L. & Y. tracks from Thornhill to Low Moor. Even though the major project was abandoned for reasons of cost, the Royston—Thornhill spur has greatly improved communication between the Midland system and West Riding cities.

High Speed Attracts Patronage

A particularly interesting feature of the London & North Eastern carriage-building programme for 1938 is the decision to build an additional third class coach for the Silver Jubilee train. It is quite in accordance with precedent that high-speed service should prove so attractive—given suitable departure times—as to result in constantly increasing patronage, and the record of the Silver Jubilee, almost from its inception, has been one of capacity loadings day after day, and of the turning away of passengers who have been incautious enough to neglect to book their seats in advance. In the United States the three competing services between Chicago and the Twin Cities of St. Paul and Minneapolis offer a striking example of how high-speed facilities create traffic; so far from the competition having resulted in sparse patronage of each route, the Burlington Zephyr diesel units, doubled in carrying capacity since their introduction, now make two double journeys daily instead of the original one; the streamlined Hiawatha of the Milwaukee road, also considerably increased in capacity, frequently requires to be run in duplicate at busy times; and The 400 of the Chicago & North Western carries more cars than when it inaugurated this high-speed rivalry in the Middle West. No adverse effect on the fine punctuality record of the Silver Jubilee is likely to be caused by the additional vehicles, as the total tare of about 255 tons will still be well below the 278 tons of the West Riding Limited or the 312 tons of the Coronation.

* * * *

Flat-Bottom *versus* Bull-Head Track

In his paper last Monday to the London Section of the Permanent Way Institution on comparisons between the standard tracks of Western European and American railways, and those of Great Britain, Mr. C. E. R. Sherrington referred to the long-standing controversy about bull-head and flat-bottom track. Mr. W. K. Wallace, who was in the chair, and who has recently had trial sections of flat-bottom track laid on the main lines of the L.M.S.R., as described in THE RAILWAY GAZETTE of May 14, 1937, remarked that his purpose in making these trials was to get down from discussion to practical experience under British conditions. He mentioned one peculiar disadvantage of bull-head track which was not shared by the flat-bottom type, and one special advantage in certain conditions of the latter over the former. The holding of the bull-head rail in chairs by means of keys necessitated daily attention, especially during the summer, to this one feature, whereas there was no risk of any such failure in flat-bottom track should it have to be neglected for longer periods. It must be admitted, however, that the use of steel keys largely overcomes this risk. The advantage of the flat-bottom track above referred to is the greater lateral stiffness of this type of rail, a matter of importance in connection with the modern tendency to weld rails into long lengths. As Mr. Wallace pointed out, when rails so welded are not allowed to expand under a rise of temperature, the resultant stress induced in the rail compels it to act as a strut and for this purpose lateral stiffness is essential.

* * * *

Another Lightweight Steam Train in America

The latest American lightweight streamlined train hauled by a steam locomotive went into the Reading Company's Philadelphia—New York service on December 13, making two round trips daily except Sundays. It is described in the *Railway Age* of December 11. The 90·2 miles separating the Reading terminal at Philadelphia and the Central Railroad of New Jersey terminal at Jersey City are covered on one trip each way in 1 hr. 45 min. with three intermediate stops, and on the other round trip in 1 hr. 50 min. with six intermediate stops. Two Pacific type locomotives have been reconditioned and streamlined by the company for the service, and a new train of five cars also streamlined and, of course, air-conditioned, has been specially built. High-tensile stainless steel and the Budd shot-weld system of construction have been largely used. The structure of the cars is that of a box girder, the roof and underframe of which serve as compression and tension cords, and the two trussed sideframes as the webs, thus giving very strong construction. The total weight of the five cars is 223 long tons, and as the average length of each car is just over 80 ft. the average weight of 44 tons is remarkably low. The total seating capacity is 280 in addition to the dining car which accommodates 51 passengers.

* * * *

Locomotive Operating Economy

Evidence concerning the operating economy of certain types of locomotives frequently indicates that alterations of one kind or another, or the replacement of a given type, might lead to improved working. Investigation of this matter brought to our notice the remarks of the author of a paper read some months back at a meeting of the Institution of Locomotive Engineers. He said that he had data which showed that Pacific type engines with poppet valves in India, doing a mean speed of 55 m.p.h. and developing an i.h.p. of 1,089, had consumed 2 lb. of coal per i.h.p.hr. With heavy side winds at an average mean speed of 50·7 m.p.h., and developing 1,236 i.h.p., 78·3 miles had been run at the rate of 58·7 lb. of coal per 1,000 gross ton-miles, and burning 54·4 lb. of coal per sq. ft. of grate per hour. The author makes the comment that these figures are capable of betterment, the Pacific type not being the most economical which could be designed. He expressed the opinion that a 4-4-2 + 2-4-4 articulated locomotive would, in addition to allowing a lighter driving axle load, be a more free running engine, and cause less damage to the track. We fully agree with the author's emphasis that to get the best results in the use of steam, it is important that the diameter of the steam pipes leading from the boiler to the cylinders be large enough to allow the steam to follow the pistons to the point of cut-off at maximum pressure.

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L.N.E.R. War on Dirt

It is difficult to imagine the combination in one person of the resource of the plumber and the daintiness of the charlady. But there is no need to imagine it. The phenomenon assumes concrete form in the staff of travelling train-cleaners announced by the L.N.E.R. as a new-year endeavour to maintain the interiors of the principal trains at " drawing room " standard. Every train-cleaner will be provided with full spring-cleaning equipment with which to dislodge dust and grime from the numerous crevices in which they delight to settle during a journey. This, by the way, does not include crevices in the rugged features of passengers, who are guaranteed immune from onslaughts with the duster, brush, and canvas bag for the collection of refuse that form the insignia of the new order. To ensure, however, that the passengers do not let the company down, the travelling cleaners will be charged with seeing that the supply of hot water in the lavatories is adequate to maintain them in a suitably scrubbed condition. They will also polish the outside door handles during station stops. Women cleaners will be recruited where conditions are suitable, as many of the duties are deemed to require the feminine touch.

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Passenger Fares and Facilities in 1938

THE substantial increase in revenue from passenger travel which the British main-line companies secured during 1937 is attributable partly to the general improvement in trade, and also to the progressive fares policy which they have pursued since 1933. The latest available Ministry of Transport statistics show that during the nine months ended September 30, 1937, there was an increase of 33 million passenger journeys (or 4·98 per cent.), compared with the corresponding period of 1936, on standard-gauge lines in Great Britain, excluding the London Passenger Transport Board and journeys made by season-ticket holders. This increase in journeys resulted in an additional revenue of £2,475,549, or 6·31 per cent., while a further increase of £235,782, or 3·65 per cent., was secured from season tickets. It is of considerable interest to find that the largest percentage increase in passenger journeys during the nine months in question compared with 1936 was in respect of journeys at standard or ordinary fares (4,956,907 journeys, or 7·49 per cent.), these presumably being principally single and not return fares; the next largest increase was in day, half-day and evening excursion trips (17,565,800 journeys, or 5·14 per cent.). So far as receipts are concerned, the largest percentage increase was obtained from standard or ordinary fares (£385,182, or 7·13 per cent.), but the largest total increase (£891,001, or 5·86 per cent.) was achieved in connection with monthly return tickets.

Nearly 40 per cent. of the railway passenger revenue during the nine months ended September last was secured from monthly return tickets, and there is no doubt that the reasonable rates of approximately 1d. a mile third class, and 1½d. a mile first class, with the availability of one month and unlimited break of journey facilities, have made these tickets extremely popular. Accordingly, they are being continued on the same basis during 1938 except for the addition of the 5 per cent. increase as from October 1, 1937. In the case of the G.W.R., L.M.S.R., and L.N.E.R. these tickets are subject to minimum fares of 2s. 6d. third class and 3s. 9d. first class but, as an experiment, these minima were abolished in 1936 between certain L.M.S.R. and L.N.E.R. stations in the North of England and Scotland, and also at a large number of G.W.R. and L.M.S.R. stations in South Wales. The results have not yet yielded sufficient data to enable the companies to decide whether the abolition of the minima fares throughout the country would be advantageous, and the experiment is therefore being continued during 1938 in the areas mentioned.

The increase of over 17 million journeys at day, half-day, and evening fares indicates that the low fares, fast services, comfortable accommodation and almost endless variety of these trips are making an increasingly wide appeal to the public. These fares were increased by approximately 5 per cent. on October 1, 1937, and will be continued on this basis during 1938. In addition to the usual trips, however, many new and attractive ones are being planned, and the combination of rail outings with road, river, and steamer journeys will be still further extended. A marked feature of these excursions during 1937 was the great increase in Sunday travel, and the L.M.S.R., L.N.E.R., and G.W.R. Companies are therefore continuing the arrangements introduced last year under which, in addition to the half-day excursion trips they run on Sundays, cheap day return tickets are issued between any pair of stations on their systems, either for local or through journeys, at the ordinary single fare for the double journey, subject to the same minimum fares as apply in the case of monthly return tickets. There has also been a substantial increase in the number of tour tickets, issued at about three-fourths of the ordinary single fare from point to point, and these are being continued on the same basis and will be obtainable throughout the year. Given a continuance of the general improvement in trade this year, the success already achieved by the holidays-with-pay movement should result in even heavier passenger carryings by railway than during the last twelve months.

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South African Railways and Harbours

THE financial year of the South African Railways and Harbours ends on March 31, and the full report for the twelve months to March 31, 1936, was analysed in THE RAILWAY GAZETTE of January 15, 1937, at page 94. In addition the administration publishes a shorter report for each calendar year. During the calendar year 1936 the revenue derived from the administration's transport services (railways, road services, harbours, steamships, and airways) reached the record figure of £37,048,562 and expenditure totalled £29,851,269. In addition, appropriations were made of £4,955,695, leaving a surplus of £2,241,598 for the year. Concessions granted to the public during the year 1936 aggregated £1,773,600, including a reduction in Tariffs Nos. 1 to 6 on all branch lines and on main lines for distances less than 200 miles, amounting to £550,000. Further concessions have been granted during 1937 which are expected to reach a value of £545,300, comprising reductions in fares on short distance suburban season tickets and in rates on coal for local consumption, milk, and cream, road motor charges, C.O.D. commission, and the abolition of the depression surcharge on goods classified in Rates Nos. 1, 2, and 3. Figures relating to railways are compared in the accompanying table:—

	1936	1935
Passenger journeys	94,930,124	88,029,607
Goods and minerals, tons	17,237,124	16,715,998
Coal traffic, tons	9,761,723	9,239,749
Route miles open	13,263	13,246
Train-miles	54,070,147	50,102,893
Operating ratio, per cent.	64·09	65·78
	£	£
Passenger receipts	5,617,910	5,126,868
Goods and mineral receipts (other than coal)	20,021,549	18,456,215
Coal traffic receipts	3,755,370	3,513,370
Total earnings	31,762,008	29,310,830
Gross working expenditure (including depreciation)	20,357,588	19,280,142
Surplus over expenditure	11,404,420	10,030,688
Surplus over interest, &c.	6,618,234	5,271,189

Post-depression and direct and indirect concessions to staff aggregate £5,251,931. Since Union the administration has provided over 5,000 houses for its staff. From 1924 European labour has been used wherever possible. A comprehensive scheme of improvements has been decided to meet new requirements, including three new avoiding lines to ease pressure in the Witwatersrand area. The entire scheme in this area will involve expenditure of approximately £5,000,000. As a result of the journey of the Chief Commissioner to Europe and his subsequent report the administration has decided to make financial provision for the acquisition, by means of competitive tenders, of 12 diesel rail-cars. Provision is also to be made for an expenditure of £475,000 for the purchase of new vehicles for road motor service. It has been decided to electrify the lines from Pinelands to Langa and Booth Junction to Wests. The elimination of seventy-seven level crossings on a cost basis apportioned between the administration and local authorities has been decided.

Danish Railways in 1936-37

DEALING first with the State Railways in Denmark, it may be noted that the year ended March 31, 1937, was the best financially for some time past. The number of passengers carried increased by 4½ millions as compared with the previous year, or by 9·9 per cent., this satisfactory increase being accounted for mainly by the Holte line electrification, which attracted an additional 3,200,000, and, actually, 60 per cent. of the tickets issued were within the boundaries of the Greater Copenhagen area, and 85 per cent. of the tickets were for journeys of under 50 km. Only 1 per cent. of the tickets was first class. Moreover, a further increase of 400,000 accrued from the extension of the State Railway bus route-mileage. Goods and livestock traffic improved by 5·9 per cent. in volume, or by 8·3 per cent. in ton-km. Under these headings the greatest increase was in livestock, 23·4 per cent. in ton-km., and the smallest under parcels traffic, 5·2 per cent.; for full-wagon-load traffic the rise was 8·9 per cent. Turning now to receipts, we find an increase under "Passengers" amounting to 6·1 per cent., principally due to reasons given above, but also to the growing popularity of the fast diesel express services. Goods receipts went up by 7·1 per cent. On the other hand, the corresponding working expenses also increased, but by only Kr. 4½ million, or 4 per cent., this additional expenditure being due to higher train-kilometrage and increase in the costs of coal and wages. Moreover, a considerable sum had to be devoted to improving and rebuilding passenger stock, and maintenance charges were unusually high due to the abnormal snowfalls during the winter of 1936-37. The net result of working was, therefore, Kr. 4,200,000 to the good, but this sum was more than counter-balanced by depreciation charges, and when interest was also taken into account, the final figures showed a total deficit of Kr. 14½ million. The following table shows the principal results compared with those for 1935-36:—

	1936–37	1935–36
Traffic statistics:		
Total passengers carried	50,104,400	45,603,300
Copenhagen suburban passengers	30,880,200	27,664,700
Other passengers	19,224,200	17,938,600
Goods and livestock, tons	4,717,484	4,457,201
,, ,, ton-km.	577,288,714	534,323,865
Financial results in kroner:		
Passenger receipts	63,443,936	59,781,450
Goods and livestock receipts	43,775,404	40,861,980
Total gross receipts	122,102,959	113,834,722
Working expenses	117,888,944	113,345,110
Net receipts	4,213,965	489,612
Depreciation charges	6,655,928	6,458,021
Interest	12,015,779	11,169,442
Final deficit	14,457,742	17,137,851

Owing to the closing of certain branch lines, the length of the system was reduced by 127 km. to 2,554 km. during the year, but in spite of this the train-kilometrage increased from 27·7 millions to 28·7 millions. Of the latter figure 7·4 millions, or 25·7 per cent., were covered by diesel or petrol railcars or trains, and 2·2 million train-km. by electric trains, so that steam locomotives were responsible for only about two-thirds of the total train-kilometrage. Actually eight diesel articulated high-speed trains, 12 diesel locomotives, 88 diesel or electric railcars, and 62 electric motor coaches are now running on the State system; the number of steam locomotives has been reduced to 416. Omnibus services covered 2,730 km., worked by 206 vehicles containing 4,554 seats.

Collectively, the numerous small private railways in Denmark were able to record a reduced deficit, thanks mainly to improved passenger receipts. Goods traffic suffered acutely from lorry competition, and registered only a very small increase in tonnage. Unfortunately, the increase of 5·8 per cent. in total gross receipts was nearly all absorbed in higher working expenses, which rose proportionately to the larger number of train-km. run; when depreciation and part interest charges were taken into account, a deficit approximately 5 per cent. lower than in the year before resulted. For the sake of comparison, the cardinal figures representing the combined traffic statistics and financial results of all the private railways are embodied in the following table:—

	1936–37	1935–36
Traffic figures:		
Passengers carried	11,048,876	10,553,801
Tonnage of goods and livestock	2,561,531	2,531,703
Financial results in kroner:		
Passenger receipts	8,734,789	7,997,436
Goods and livestock receipts	8,451,811	8,209,527
Total gross receipts	20,747,131	19,611,035
Working expenses, including depreciation and part interest	22,312,132	21,253,760
Deficit	1,565,001	1,642,725

Diesel or petrol services accounted for as many as 11,091,748 out of a total of 13,422,923 train-km. run, or 83 per cent. Altogether, the private railways have 184 diesel or petrol railcars and locomotives, and it is clear that internal-combustion traction is now very firmly established in Denmark, the home of some of the most reliable types of diesel rail units yet produced.

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U.S.A. Locomotive Statistics

A SURVEY of the locomotive situation in a country of the size of the United States, necessarily entails an extensive investigation, for any one of its numerous aspects might reasonably be regarded by itself as a complex study. Such an investigation has, however, been undertaken by the Baldwin Locomotive Works, and the result is seen in a painstaking report covering 85 large pages of printed matter. This covers the whole statistical field of locomotive utilisation in America, and deals with the locomotive demand for a period of several years, the investment policies since 1922, the cost of locomotive operation and maintenance, and the effect of age on the cost of repairs. Reference in detail is made to the present railway policy where the renewal of locomotives, and the repair of existing stock are concerned; and there are also chapters on the possibility of greatly intensifying locomotive use, and the importance of adequate depreciation charges. It is pointed out that the passenger business of the steam railways in the U.S.A. is today at approximately the same volume as in 1901. Railway passenger-miles increased from 29,083,000,000 in 1908, to 32,475,000,000 in 1915, and to 47,370,000,000 in 1920. In 1921 a sharp reduction occurred, and since that year the volume of passenger traffic has shown a declining trend, until in 1933 the passenger-miles on the railways had sunk to 16,368,043,000. This declining trend was, however, reversed in 1934, the passenger-miles increasing to 18,036,000,000, followed by a further increase to 18,521,000,000 in 1935, and a still greater increase, namely to 22,450,000,000, in 1936.

The growth of revenue ton-miles of freight hauled by the American railways has been steadily declining since 1905. From 1923 to 1929 inclusive, there was an average growth of about 1·3 per cent. a year, reaching a total of 450,189,000,000 revenue ton-miles in 1929. The railway freight business of the country as a whole has been growing during the last twenty years at a rate more rapid than that of population, but is gradually slowing down to coincide therewith. The Interstate Commerce Commission reported that on December 31, 1936, there were

45,146 locomotives of all types on the Class 1 railways, and it is estimated that there were 47,850 locomotives on all public service steam railways in the United States. Of the total locomotives on all railways, approximately 28,566 or 59·7 per cent. are twenty years old or more; 16,127 or 33·7 per cent. are ten years old and less than twenty years of age; and only 3,158 or 6·6 per cent. are less than ten years of age. The advance in the art of steam locomotive engineering and construction has been so rapid since the war that only those locomotives built during the last ten years can be regarded as modern. This means that about 93·4 per cent. of all locomotives, measured numerically, and 91·2 per cent. by tractive power, are more or less obsolete.

Operating and maintenance expenses for the locomotives on Class 1 railways average, for the four years ending in 1929, $1,366,279,000 (about £273,250,000) a year, representing 21·7 per cent. of the total operating revenue, and 30·9 per cent. of the total operating expenses of the railways as a whole. During the years 1930-33, the Baldwin Locomotive Works analysed the maintenance and operating costs of over 10,900 locomotives, representing over 26,400 locomotive-years, and constituting the bulk of the freight locomotives of fifteen Class 1 railways in various parts of the country. These studies showed that there is a steady and inescapable increase in maintenance cost with advancing age. From the first to the third year in the life of a locomotive, its maintenance cost per unit of service rendered approximately doubles, whilst from the third year on, the maintenance cost steadily increases. From the first to the twentieth year, the total increase is at an average annual rate of approximately 6·2 per cent. The report goes on to state that the direct savings that can be made by the use of modern locomotives properly built for the service required, are sufficient in a period of normal traffic volume to pay interest upon the cost of such replacement and amortise it completely in from three to ten years. These savings are due to reduction in maintenance and fuel costs and in traffic economy, and result from the benefits arising from the smaller number of units in operation.

Locomotive service is reviewed in particular relation to long-distance working of individual engines. This, it is stated, has revolutionised the conventional expectation of annual mileage to be obtained from a locomotive. The modern unit is capable of making continuous runs up to 1,000 miles, and it can remain in constant service and under steam for weeks at a time. Instead of the 30,000 to 40,000 miles a year which has been the average expectation of the work of a good freight engine, the advanced practice on a few lines has indicated the practicability of obtaining annual mileages ranging from 75,000 to 125,000. If it is assumed that a modern locomotive should, during its lifetime, be good for 1,000,000,000 locomotive-miles, then an average annual mileage of 66,666 miles will produce that service in 15 years. Stress is laid on the fact that the American railways have never purchased locomotives in a methodical manner, i.e., by the acquisition each year of a certain percentage, more or less, of their existing inventory in new locomotive stock, but have always waited to make new acquisition until traffic conditions urgently demand them. In the past 10 years, the input of new engines exclusive of rebuilt units has amounted to only 3,336, with an estimated 47,850 locomotives on line at the end of the period. A useful life of 25 years would mean an average annual retirement and replacement of 4 per cent., or at the present estimated replacement value, a purchase of new locomotives of about $140,000,000,000 (£28,000,000) new value a year. Probably the chief obstacle to such a programme is the inadequate depreciation reserves which the railways have accrued to date. The compilers, in concluding their report, state that it is made in full recognition of the increased interest in and use of diesel power in recent years. Nevertheless, modern steam power must continue to be the mainstay of railway operation for an indefinite period in the future. In support of this, it is further remarked that, although the steam locomotive is now over 100 years old, it is still moving the bulk of passenger and freight traffic in the railways of the world. Today, lightweight trains and diesel locomotives are in service on a number of prominent railways, and some enthusiasts would have it that the steam locomotive has now run its course. Considerations of space make it impossible for us to do more than refer thus briefly to this voluminous report, to which are attached five appendices, and a number of charts and tables. It is one of the most interesting documents on the subject of locomotive operation we have had before us for some very considerable time. Intended more or less for private circulation only, it serves to enlighten those who read it as to the true situation in America regarding steam locomotives and their use, and in our view it conclusively proves that there is much which might be done in that country to stabilise the production and replacement of locomotives, thereby leading to almost incomprehensible economies.

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Arthur Martin Leake, V.C. with Bar

THE Indian railway world has recently bid farewell to one of its most striking though unassuming personalities, Arthur Martin Leake, V.C. with Bar, F.R.C.S., Chief Medical Officer of the Bengal-Nagpur Railway since January, 1904. Dr. Leake was not only the first medical man, but the first of His Majesty's subjects to be awarded a Bar to the Victoria Cross. He also probably holds the world's record for occupying the position of Chief Medical Officer of an important railway for 34 years. For his remarkable bravery in both the South African War and the Great War, recognised by his double V.C., the British Medical Association awarded him the Gold Medal for Distinguished Merit in 1922. In connection with Dr. Leake's leaving India on leave preparatory to retirement, the *B.-N.R. Magazine* quotes the text of the address presented to him by the British Medical Association when that medal was awarded, and in it occur the following passages. " . . . in 1902 H.M. King Edward VII awarded you the Victoria Cross under the following circumstances:—

> For great devotion to duty and self-sacrifice at Vlakfontein, February 8, 1902, when he went out into the firing line to dress a wounded man under very heavy fire from about 40 Boers only 100 yd. off. When he had done all he could for him, he went over to a badly-wounded officer, and while trying to place him in a more comfortable position, he was shot three times. He only gave up when thoroughly exhausted, and then refused water until other wounded men had been served.

In February, 1915, the following notice appeared in *The London Gazette*:—

> Bar to Victoria Cross. For most conspicuous bravery and devotion to duty throughout the campaign, especially during the period, October 29 to November 8, 1914, near Zonnebeke, in rescuing, whilst exposed to constant fire, a large number of wounded who were lying close to the enemy's trenches.

The embodiment of quiet dignity and supreme patience, Dr. Leake abhorred publicity, but with his contempt for danger he was a famous *shikari*, and in his spare moments was a cartoonist of no mean order. As well as the wonderful example in the life he lived, he has left behind in India a true sense of personal loss and affectionate regard, which is shared by all creeds and classes.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Main-Line Electrification

25, Victoria Street, London, S.W.1
January 7

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I notice that in the final paragraph of his last letter Mr. Johnston infers that in my book, "The Railway Problem," I thought it unlikely that the lines to Brighton and Eastbourne would be electrified. In the circumstances possibly you will permit me to quote the following paragraph from page 121 of the work to which Mr. Johnston refers:—

"But, improbable as any scheme of wholesale electrification may be, it would be folly to rule out the possibility that the electrification of certain lines will take place from time to time. The Southern Railway, for instance, will almost certainly be pushed by the mere logic of events into the gradual electrification of that section of their line which constituted the old L.B. & S.C. Railway."

Mr. Johnston is of course entitled to his opinions, but I would beg him not again to interpret anything I have written. Obscure as my style undoubtedly is, I feel safer when the reader is left to his own conclusions.

Yours very truly,
ASHLEY BROWN,
General Secretary

[We do not feel that any useful purpose will be served by continuing this correspondence.—ED., *R.G.*]

The Slip Coach

60A, Green Lane, Northwood,
Middlesex, January 9

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Your amusing illustration in the issue of January 7 of the slip coach switched on to a parallel line, recalls a practice common on the G.W.R. many years ago. Thus MacDermot's "History of the G.W.R.," Vol. I, p. 653, says "The practice of diverting a slip coach from the line on which the train passed was quite usual in those days [1866] and for long afterwards. As the coach was detached a mile or more from the station and followed the train at a very respectful distance, there was generally no difficulty in changing the points between them. For several years from 1869 onwards the evening express to Birmingham *via* Didcot loop used to slip a carriage for Didcot which ran into the station and connected with a slow train to Swindon, while the Reading slips off up trains were diverted across the down line into the up station there." This practice at Reading lasted from 1864 to 1898.

Yours faithfully,
REGINALD B. FELLOWS

Centenaries of 1938

London, January 10

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The continental centenaries referred to in the interesting article in your issue of January 7 do not include any mention of Spain, and for the apparently good reason that there was no railway constructed or opened to public traffic in the Peninsula until several years after 1838. Nevertheless, I think it should be recorded that the Spaniards were by no means ignorant at that time of progress elsewhere, or behindhand in initiating steps to introduce to their own country the benefits of the recently invented improvements in methods of transport. Unfortunately, political unrest and domestic strife nullified these efforts and the only centenary that can be recorded now is, sad to relate, a negative one. In the year 1838 two railway concessions lapsed. These were the two concessions granted by King Fernando VII in 1829 and 1830 for railways in Jerez. The first was in the name of Don José Diez-Imbrechts, dated September 23, 1829, and was for a short steam-operated railway of 6 km. The second was in favour of Don Marcelino Calero, dated March 28, 1830, also for a railway in Jerez, but a more ambitious scheme, the line proposed being 50 km. long. Calero lived in London and published a pamphlet here on the subject of his scheme. However, people in Spain were too busy with politics, and although King Ferdinand supported both schemes (one of them by subscribing for shares out of his private purse) there was no other support, and both concessions lapsed a century ago.

The causes of this are not far to seek. After the death of Fernando VII on September 29, 1833, serious political disturbances led to the first civil war, which ended with the Vergara agreement of August 31, 1839. Even then there was no real peace politically, especially during the regency of Espartero, 1841 to 1843. Otherwise, it is fairly certain that the Jerez concessions, with all the Anglo-Spanish wine interests behind them, would have been converted into working railways and Spain would have figured among those countries mentioned in your article. Incidentally, we can only regret that this reference to early Spanish railway enterprise involves mention of the civil war which in 1838, as now, distracted the country. Isabel II took the oath on November 10, 1843, when she was thirteen years of age, and another period of railway enterprise began. The first railway to be opened to public traffic in Spain was the Barcelona-Mataró line. It was begun in 1847 and opened on October 28, 1848. The concessionaire was Don José Maria Roca, again a Spanish resident in London, and the capital was half English. Joseph and William Locke were the first engineers and the contractors were Mackenzie and Brassey. Connected with Roca was Don José de Salamanca, who built the Madrid-Aranjuez line opened on February 9, 1851. This line cost 250,000 pesetas a kilometre and it was equipped with the first electric telegraph instruments used in Spain. The journey from Madrid, 49 km., was made in a little over the hour.

I am, Sir,
Yours faithfully,
GEORGE L. BOAG

New Midland Timetables

70, Holifast Road, Erdington, Birmingham
December 13

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Now that new timetables are likely to be introduced on the northern part of the old Midland lines, I would like to suggest the institution of through express facilities between St. Pancras (and the Midlands) and the East Lancashire district, *via* Leeds and Skipton. The important manufacturing district stretching from Colne to Accrington at present has one good service (Saturdays excepted) to and from Euston provided by the Fylde Coast Express, with through carriages on the down journey only. Other services, given by the 10.30 a.m. down and the up Lancastrian, are appreciably slower, and involve a tedious journey *via* Blackburn and Stockport. (The up Mancunian gives a connection but almost exactly coincides in time with the Fylde Coast Express; there are also possible services by the Comet, but crossing Manchester is involved.)

Accelerated services should bring Skipton within about 4¼ hr. of St. Pancras, and Burnley could be reached in 4¾ hr., as against about 5 hr. by the best Western Division service: the saving to Nelson and Colne would be considerably greater. No reversal is needed at Skipton, and such a service would relieve heavily-loaded Western Division trains, and bring much needed traffic to the Midland main line north of Leeds. Keighley, which at present has no through day service to any place south of Leeds, might well be included in these facilities, and connection be given to the Midlands. (I believe the cotton district trades a lot with Leicester.)

While writing of services on the Leeds-Carlisle line, I have

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often been surprised that the L.M.S.R. makes no effort to bring holiday traffic to this district. From Skipton to Carlisle the Fell country is ideally suited for open-air holidays, yet such excellent centres as Settle, Ingleton, Sedbergh, Hawes, or Kirkby Stephen have no express or through services at all, and Grassington has no regular passenger service of any kind. The district is never advertised, caravan coaches are not placed in it, and I cannot find any mention of "contract" tickets covering the lines in it. Here, surely, is a chance for the company to rejuvenate a very senile main line, by providing express holiday services from London, the Midlands, Yorkshire, Lancashire and Scotland; by advertisement literature; and the compilation of lists of holiday accommodation. Tactfully undertaken, such an enterprise need incur no criticism on the score of spoiling local amenities—the district would never appeal to the vandal.

I am, Sir,
Your obedient servant,
W. T. WARNER

Exhaust Steam Injectors

Charles Street, Alfreton, Derby,
December 23

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Your editorial under the above heading on page 1007 of your issue dated December 10, 1937, is interesting in that numerous points are raised which are of primary interest and importance to practical locomotive men.

The contention that an exhaust steam injector is probably the simplest, lightest, and most efficient instrument for utilising a portion of the heat of the exhaust steam is justified provided that the running shed staff is fully trained in the diagnosis of defects reported by the footplate staff, and in the proper handling of the components of the injector. A corollary to this is the instruction of the footplate staff in the correct and economical use of the injector, and in the method of booking irregularities in working, so that the repairs card may give to the fitter an intelligible idea of the defect.

With regard to the steadiness of the steam pressure gauge when an exhaust injector is used, this desideratum is obtained only provided that the size of the injector delivery cone has been carefully determined to suit boiler requirements. It is not uncommon to find that with every application of an exhaust injector, on a large-boilered engine especially, the boiler is flooded in 3 to 5 min., coincident with a reduction in steam pressure of from 10 to 20 lb. per sq. in., even when the feed water regulator handle is set in the minimum position, and more so when the engine is working heavily. A modification in the size of the delivery cone will usually effect a cure for this phenomenon, which, unless remedied, nullifies the object in fitting the exhaust injector, as a fireman is reluctant to use it, if by using his live steam injector he can apply it for comparatively long periods, and maintain a steady steam pressure.

There is no doubt, however, that after a long record of gradual development and improvement, the later types of exhaust injector, which are fully automatic in action, and in which opportunity has been taken to incorporate the results of metallurgical advance in the form of stainless steel valves, clacks, &c., are a really first class engineering job and it behoves the railway administrations to ensure that the necessary technique is developed by the staff responsible for their maintenance and operation.

Yours faithfully,
W. G. F. THORLEY

[If it is found on certain locomotives that the exhaust injector floods the boiler, as stated by our correspondent, then, of course, the trouble is that the size of injector is too large for the type of locomotive, and a smaller set of cones should be fitted giving a smaller capacity. It does occasionally occur that oversize exhaust steam injectors are fitted owing to the fact that the designers determine the size of the exhaust injector in a similar manner to that of the live steam injector, overlooking the fact that the exhaust injector should serve to heat the feed water. On a locomotive, the live steam injector is, as a rule, worked intermittently, so that its capacity must be slightly larger than the maximum rate of evaporation of the boiler, but the exhaust injector, being a feed-water heater, should always be worked continuously, and therefore the mean capacity of the injector should be about equal to the average boiler evaporation. The maximum rate of evaporation of the boiler is rarely attained, and then only during short intervals such as during a heavy hill climb, &c.

With live steam injectors, in order to maintain the steam pressure, the footplate practice when the engine is heavily worked—as when climbing a gradient—is usually to reduce the feed to the boiler, and gradually lose water. Then at the top of the gradient when the heavy working ceases, to put the injector to work at full capacity so as to fill the boiler very quickly. With the exhaust steam injector which can be operated at average capacity even during the heaviest working, maintaining a constant water level and steady steam pressure, the heavier the engine is worked, the more exhaust steam is returned to the boiler, owing to the increase of the exhaust steam pressure.

On any locomotive, the exhaust steam injector should be of smaller capacity than the live steam injector, and if the size of injector is determined on the basis of mean instead of maximum boiler evaporation, this trouble could not be experienced. In any case, as smaller size cones can always be fitted to any injector, it seems evident that the fault lies largely with the footplate staff in not pointing out to headquarters that the capacity of the injector is too great, as otherwise it may be taken as certain that the correct size cones necessary to maintain continuous feed, would be fitted. —ED., *R.G.*]

Railway Coach Ventilation

Birmingham,
December 22

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—As a person interested in railways and also a passenger who travels many thousands of miles in a year, I am naturally interested in the ventilation of coaches, which has during the last few years improved, to the benefit of all passengers.

The improvement was particularly noticeable some few years ago, when the majority of the companies introduced the horizontal sliding windows, on the outside of which were fitted moving blades. With the windows fully open, the air in the coach was kept clean and fresh without any draught.

While on a journey recently in a new coach, I noticed that when the sliding windows were open a distinct draught was caused in the compartment. As I was alone I tried opening the window in various positions, but found that if it was open more than approximately 8 in. the draught continued to make things uncomfortable. Continuing to be inquisitive, I noticed that although the windows appeared to be the same type, the blades were different. These were a new design, fixed in a permanent position, and were not movable.

I have since experienced the same conditions on similar coaches. Is this the cause of draught? It would be most interesting if some of your technical readers could explain.

Yours, etc.,
T. GRIFFIN

[Our correspondent does not specifically mention the coaches of any particular railway, but we think we are correct in assuming that he refers to the L.M.S.R. The sliding windows in the latest coaches of this company are of the fixed vane pattern, and this was adopted because the removable vanes previously used were constantly being damaged in the carriage cleaning operations. It is found that, when running, the fixed vane acts perfectly satisfactorily as a ventilator if the window is opened to 1 ft. in width. It is true that the movable vane, assuming the rear vane to lie against the window, permits of the latter being opened a little more than the width mentioned, and still allows the opening to act as an extractor. The difference is, however, so small that it was considered the fixed vane had many advantages and maintained its condition very much better than the movable vanes.—ED., *R.G.*]

PUBLICATIONS RECEIVED

Mathiesons' Handbook for Investors for 1938. London: Fredk. C. Mathieson & Sons, 16, Copthall Avenue, E.C.2. 6½ in. × 3½ in. 352 pp. Price 5s. net.—Now in its 39th year of issue, this well-known handbook affords a useful record of Stock Exchange prices and dividends for the past ten years of a number of selected securities, particulars of which are compiled for the year 1937 up to the end of November. Investments are grouped under 45 headings, and a comprehensive index facilitates reference. In the section relating to British railways particulars are given of all the stocks of the four group companies and of the Great Northern (Ireland). Records are given also of fourteen Indian railways, fifteen Dominion, nineteen American, and many of the more important foreign railways. The handbook also contains the dates of Stock Exchange settling days and holidays, a perpetual yield table, information for trustees and as to income tax for investors, as well as mention of the dividend taxes in Canada and Argentina, and the rate now levied in the U.S.A.

Clear Track Ahead, the New Haven Railroad Supplement—published in celebration of the progress of American railroading—to the Boston Sunday Globe. 20 pp.—This striking supplement has as its frontispiece the reproduction of a photograph of New York, New Haven & Hartford Railroad locomotive No. 1400 and the Comet streamlined diesel express side by side on parallel tracks. During the twelve months ended May 31, 1937, 14,676,166 New Haven Railroad passengers—9·6 per cent. over the preceding twelve months—passed through South station, Boston, and 15,387,527—24·4 per cent. more—passed through the Grand Central terminal in New York. Among the features of this railway described are: the new grill cars (also described in our issue of December 31 last); the 150 new streamlined and air-conditioned coaches, built of alloy steel and 15 tons lighter than the older vehicles; the Narragansett popular *de luxe* night train; the newly-appointed attractive hostesses on the Merchants' Limited, Pittsburgher, Bay State, and most other Boston-New York expresses; the hundred-per-cent. safety record of the system during the last six years — 2,560,000,000 passenger-miles per death in a train accident—secured by the expenditure of millions upon modern safeguards; the famous Owl premier night train of the East, as in all other trains full air-conditioned; summer Picture trains visiting various picturesque spots and intended primarily for the amateur photographer and artist; the Yankee Clipper and Merchants' Limited crack flyers, covering the Boston-New York run of 229·1 miles in 4½ hr.; the famous duralumin streamlined Comet diesel train; the Besler steam two-car streamlined train or railcar set; and the New Haven freight-services. Altogether the supplement is a remarkable record of all the modern equipment of this enterprising line, and it includes portraits of its principal officers.

Year Book and Guide of the Rhodesias and Nyasaland, with Biographies, 1937. Salisbury, S. Rhodesia: Rhodesian Publications Limited, P.O. Box 1082. 7¼ in. × 4¾ in. × 1 in. 640 pp. + xxxii pp. Paper covers. Price 3s. 0d. net.—The primary purpose of this 672-page publication is to represent the associated interests of the three countries of Northern and Southern Rhodesia, and Nyasaland. It also enables residents in the countries to have a ready reference book as regards revenue and expenditure, trade and commerce, transport, and the industrial and sports developments and activities of the three countries concerned. By continually keeping matter up to date such a book enables every citizen, if he so wishes, to take a knowledgeable and intelligent part in the affairs of the community. Another aspect of usefulness is that it provides information and advice for prospective settlers and tourists. With regard to the former it is invaluable, as the combined information given forms a sound basis for intending or possible settlers to judge of the openings for enterprises and the nature of the life of residents in the three countries. The biographical section contains over 500 entries and it is hoped to enlarge this in the next issue.

L.N.E.R. Tide Tables.—The L.N.E.R. Tide Tables for 1938 have just been issued and may be obtained free from the portmaster at the port concerned. The tables are bound in three volumes of a handy size for the pocket and contain information regarding high tides, depth of water, phases of the moon, and accommodation available at the various docks. The volumes deal respectively with: Middlesbrough dock; the Hartlepools; and Hull, Immingham, and Grimsby.

Copper in Cast Steel and Iron.—This volume ranks as publication No. 29 of the series issued by the Copper Development Association of Thames House, Millbank, S.W.1. It contains 127 pages, plus a seven-page index, and deals exclusively with the influence of copper additions on the properties of cast steel and cast iron. After an introductory summary concerning the part played by copper in the recent renaissance of the ferrous foundry industry, succeeding chapters describe the manufacture of copper cast steels and cast irons; and the metallurgical influence of copper on iron-carbon alloys. Matters discussed in other chapters include the influence of copper on graphitisation in iron-carbon alloys, and the effect of copper on the mechanical properties of cast steel and cast iron. The remaining subjects treated are the precipitation hardening of copper cast steels and cast irons, and the influence of copper on the corrosion resistance of these materials. Five appendices tabulate respectively the cost of copper additions, hardness, temperature, and stress conversions, and decimal equivalent fractions of an inch. The text is liberally illustrated with half-tone reproductions and drawings. A well-calendered paper is used, and the text and illustrations are in all cases noteworthy for their clearness.

Modern Service for Shippers.—Details of the fast freight services operated by the Canadian Pacific Railway on the Atlantic, the Pacific, the South Seas, and across Canada are given in concise form in a well-set-out brochure which we have received from the company. This publication, which should prove of great interest and help to shippers, is illustrated with a number of pleasing photographs. It also contains a large coloured map of the company's world services together with other useful maps showing the boundaries of the harbour of Montreal and of the Port of London central dock area.

Welding Railway Crossings.—Instructions for the reconditioning of railway crossings by electric-arc welding are very clearly set out with illustrations in a booklet recently issued by Murex Welding Processes Limited, of Ferry Lane Works, Forest Road, London, E.17, under the title "The Maintenance of Permanent Way on Railways by Electric Arc Welding." The purpose of the booklet is to summarise in a convenient form information now available on this development in permanent way maintenance practice, which has now passed the experimental stage. Descriptions are included of the Murex welding plants and also of Rolex 2 electrodes. Both have been designed especially to meet the demands of railway engineers and are now extensively used. In the notes on building up worn crossings it is mentioned that promising results have been obtained by keeping the nose of the crossing vee level instead of $\frac{3}{16}$ in. below the wings, the welded surfaces of the latter being ramped to suit the 1 in 20 coning of wheel treads. It is also stated that on an average the welding of a crossing requires approximately 70 ft. of electrodes, 60 ft. being No. 8 gauge, and 10 ft. No. 10 gauge. With cables of 0·10 sq. in. sectional area, welding can be done at a distance of 150 ft. from the plant. A note is included on the subject of preheating the head of the rail before welding. This is quite easily accomplished by means of a simple heating element placed on the rail and connected to the welding dynamo, which is adjusted to supply about 160 amperes at 30 volts. After 10 to 12 minutes a temperature of 200° to 220° C. is reached. A large paraffin blow-lamp may be used as an alternative.

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THE SCRAP HEAP

An experiment in heating carriages by the exhaust steam from the engine on the plan conceived by Mr. Thompson, General Manager, and developed by Mr. Drummond, the Locomotive Engineer, was made on the Caledonian Railway on Wednesday, February 13, 1884.

* * *

STRANGE PASSENGERS BY RAIL

A consignment of wild animals for the Kelvin Hall Carnival, Glasgow, formed an unusual L.N.E.R. trainload recently. The animals were brought into Leith by the ss. *Lady Martin* and transferred to rail at North Leith goods station for Glasgow. Making up a very "mixed freight" were the following fauna :—

9 ice bears, 4 brown bears, 6 lions, 1 sea elephant (weighing 3½ tons), 6 elephants, 2 tapirs, 1 small hippopotamus, 2 ostriches, 6 rheas, 2 zebras, a cassowary, 1 water-pig, 2 porcupines, 4 Maras (hares), 1 small antbear, 48 monkeys, 4 nutrias, 4 small kangaroos, 2 emus, 10 penguins, 1 wild dog, 1 panther.

The large animals (except the elephants) were in cages completely encased by metal sheets and were loaded on six special purpose well wagons. The elephants were walked to North Leith goods station and loaded in one specially strengthened covered van, and the small animals, which were also in cages encased with wood were accommodated in five covered ventilated vans. Discharging began at 8.0 a.m. and everything was loaded and left by special train at 3.50 p.m., arriving Glasgow 7.40 p.m. Considerable time was taken by the Customs Officers in passing this unusual cargo. Unloading from the rail vehicles at Glasgow began at 8.30 p.m. and completed by 11.0 p.m. Owing, however, to the cold weather, the elephants remained in the railway van until morning. The ss. *Hengist* also unloaded 22 horses from Hamburg the same day for the same carnival, and they were also conveyed by a special train to Glasgow.

* * *

TRAIN TRAVELS "1,000 TIMES ROUND EARTH."

A famous train has now traversed more than 1,000 times the distance round the earth at the equator, and has carried approximately 3,000,000 passengers. The International Limited, Canadian National Railways express, has set up these huge figures during the 37 years it has been operating between Montreal and Chicago. The International Limited was inaugurated on June 24, 1900, as a fast Grand Trunk flyer travelling between Montreal, Toronto, and Chicago. It carries an average of nine cars, but frequently consists of 12, 13, and 14 cars and in holiday times runs in two and three sections. Five big locomotives of the "5700" class, which were put into the service seven years ago, have travelled 3,500,000 miles, or 140 times around the world. Previously it took three locomotives to make the run between Montreal and Toronto, changes being made at Brockville and Belleville. The "5700" class engines go the whole way —333 miles. It used to be the practice to run an engine for about 50,000 miles and then give it a general overhauling, but now the engines of the "5700" class are running an average of about 250,000 miles between general overhauls.

* * *

The principle of deodand was a useful method by which a Coroner's Jury made a railway company pay for the negligence of its servants. This quaint custom of ancient law made a chattel which had been the immediate cause of any one's death to be forfeited. Thus, if a horse killed a man, or a tree fell and killed a passer-by, the horse or tree was deodand—given to God—*i.e.*, forfeited to the Crown to be sold for charitable purposes. Railway engines have been known to be made deodand in the case of a serious accident, and a notable case was that which occurred on the Grand Junction Railway between Liverpool and Birmingham in March, 1838, when a collision took place between a light engine and a passenger train. Four men were injured and one man was killed, and the Coroner's Jury made the engine deodand. The law of deodand was abolished by Statute in 1846.

One Hundred Years Ago

Extracts from the January, 1838, issue of "The Railway Magazine" (afterwards "Herapath's Railway Journal") and the oldest constituent of THE RAILWAY GAZETTE

Birmingham Railway.—About the end of January it is expected eighty miles of this railway will be opened, namely from Birmingham to Rugby, thirty-two; and from London to Stony-Stratford, forty-eight. The Kilsby tunnel on this line about 1⅜ mile, we hear will cost at least £400,000. The Coventry district will probably be finished by the middle of January.

Greenwich Railway Gas Company is about to be dissolved, the works being sold to the Deptford Economic Gas Company. We notice this, as the advertisements relating to the Gas Company have been erroneously supposed to relate to the Railway Company, whose works, we are happy to say, are progressing to Greenwich, rapidly. They are expected to be finished in May, by which time it is expected the Croydon will also be opened.

Russia, St. Petersburgh.—On Saturday, November 11, the iron railroad from this city to Czarskojeselo was opened. There were 150 persons conveyed in eight carriages, four open and four covered, drawn by one steam-engine of forty-horse power, manufactured by Mr. Stephenson in England. The distance of twenty-one versts and a half (fourteen miles) was traversed in thirty-seven minutes in going, and in twenty-eight returning.

Hayle and Redruth Railway.—The railway embankment across the valley between Carn Brea and Redruth is very nearly completed; and it is not expected to be very long before carriages will be able to pass over the whole line from Hayle to Redruth.—*West Briton.*

James Watt.—"Possessing such requisites, and a splendid benefactor of his country, it is remarkable that Government never conferred any honour upon Watt. Immersed in expensive wars, which deluged foreign lands with the blood of our fellow-creatures, it sought only to bestow rewards on those who were foremost in the fight. It was perhaps well—the days of these men are past, but those of Watt will endure for ever. The visiter [*sic*] to the ancient relics of Westminster Abbey may have noticed many a gorgeous monument, in memory of individuals who have left no record behind them save these heartless stones, or a notice perhaps in the history of battles of their having assisted in the premature death of some friend of freedom, or unfortunate foe; he looks long in vain for the monuments of those who have succeeded in advancing the powers of the mind, and at last espies an obscure tablet, which tells that only a mere spot can be spared for the truly mighty dead. The memory of Watt was left to be established in peaceful times, when a philosopher, the hero of intellect, is valued above a hundred warriors, the heroes of the passions; for Watt assisted 'in superseding the barbarism of war.'"—*Thomson's British Annual for 1838.*

Turbine.—An instrument under this name has lately been invented by M. Fourneyron, worked by water-pressure, which is said to have made a great sensation in Germany. What is the particular description of it we have not learned; but we suspect it is a sort of wheel with bent or spiral hollow spokes, probably on the principle of Barker's mill. For it is said that a turbine, only thirteen inches diameter, working on an axle, under a vertical pressure of water of 118 yards, revolved 2,300 times in a minute, and expended only 46 grains troy of water per second, yet realised a power, which estimated in steam, would be equal to that of sixty horses.

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OVERSEAS RAILWAY AFFAIRS

(*From our special correspondents*)

ARGENTINA

The Results of Two Months' Railway Working

The passenger and goods traffic carried by the privately-owned Argentine railways during the first two months of the current financial year showed an increase over the corresponding period of 1936-37, while the gross receipts from both sources also showed an improvement amounting to some two million pesos; but this increase was offset by higher expenditure, which rose by some $2,700,000 paper, thus making the net receipts $810,000 paper, or 5 per cent. lower than the corresponding period of the previous financial year.

The following table shows the gross receipts from all sources for each individual railway during these two months as compared with 1936-37:—

	Gross receipts. $ paper	
	1936–37 (First two months)	1937–38 (First two months)
Santa Fé Prov. ...	3,009,000	2,806,000
Cia. General ...	2,267,000	2,521,000
Cordoba Central ...	5,708,000	5,797,000
Entre Rios	1,901,000	2,110,000
Argentine N.E.	1,434,000	1,538,000
B.A. Central	1,138,000	1,363,000
B.A. Gt. Southern ...	16,864,000	17,194,000
B.A. Western	6,014,000	6,663,000
Central Argentine ...	21,662,000	21,141,000
B.A. & Pacific	11,153,000	11,613,000
Rosario-Pto. Belgrano ...	797,000	1,061,000

The gross receipts as a whole thus show an increase of 2·6 per cent., but, owing to a rise of 4·8 per cent. in the expenditure, the net receipts on many of the lines, especially the Central Argentine, compare unfavourably with the corresponding two months of 1936-37, as shown by the appended table:—

	Net receipts. $ paper	
	1936–37 (First two months)	1937–38 (First two months)
Santa Fé Prov.... ...	795,000	501,000
Cia. General	236,000	383,000
Cordoba Central ...	1,729,000	1,566,000
Entre Rios	412,000	460,000
Argentine N.E. ...	506,000	527,000
B.A. Central	135,000	228,000
B.A. Gt. Southern ...	3,328,000	3,263,000
B.A. Western	461,000	1,157,000
Central Argentine ...	6,825,000	4,999,000
B.A. & Pacific	1,644,000	1,970,000
Rosario-Pto. Belgrano	126,000	333,000

Visit of Institution of Civil Engineers (Buenos Aires Association) to Chile

During the month of October last, a party of 32 members of the Buenos Aires Asociation of the Institution of Civil Engineers made an extensive tour of the Chilean State Railways, as the guests of the Director-General, Engineer Señor Juan Lagarriague. The party left Buenos Aires on October 22, and travelled *via* Bahia Blanca, Patagones, and Puerto Blest to cross the frontier into Chile at Peulla. At Puerto Varas the visitors were met by the Director-General of the Chilean State Railways, the Chief Engineer, and other officials, and were also welcomed by the Governor of Puerto Varas.

Among the most interesting works visited were the viaducts over the Rio Malleco, and the Rio Bio-Bio, and the Chief Engineer explained the methods adopted in the recent strengthening of these structures. The relaying of the main line under modern mechanised methods impressed the visitors with its speed and efficiency. The copper mines and smelter at Sewell were also visited, on the way to Santiago.

Here the party divided into two groups, the first visiting the State Railway locomotive shops at San Bernardo; the second the bridge building and permanent way shops at San Eugenio. The Las Cucharas viaduct, the new terminal station at Valparaiso, and the Valparaiso port works were also inspected, prior to the return *via* Los Andes and Mendoza. The entire tour covered nearly 5,000 km., and occupied 9½ days.

On page 82 we publish a group taken in Chile of the visitors and some of the Chilean State Railway officers.

At a meeting of this association, held in Buenos Aires on November 30, Group-Captain A. J. Miley, O.B.E., R.A.F., Air Attaché to the British Embassy, delivered a lecture, illustrated by lantern slides, on "Aircraft Construction." The Chairman of the association, Mr. M. F. Ryan, C.B.E., M.Inst.C.E., General Manager, B.A.P. Railway, presided.

BRAZIL

Sorocabana Railway

Industrial and agricultural progress continues with unabated vigour in the area served by this line, and unlike the majority of railways in Brazil, the Sorocabana is in the enviable position of being able to keep pace with such progress effectively. Some three years ago, 1,100 wagons and 14 locomotives were acquired, an increase of 30 per cent. on the rolling stock existing at the time, and in June of last year a further order for 500 wagons was placed to meet urgent requirements. These 36-ton wagons have a tare weight of 12,500 kg., and are expected to arrive before May, 1938; they are intended for cotton, the production of which has increased considerably during the last two years.

To meet the increased passenger movement, two all-steel 12-coach rakes and two 3-coach diesel sets are on order for express services.

Despite such important acquisitions, at a cost of approximately 34,500 contos, the forthcoming opening of the new Mayrink-Santos line is expected to create new difficulties, as coffee, destined for Santos, is already being dispatched from the Alta Sorocabana and Itauna areas and from the north-western zone of the Paulista, *via* Mayrink, thus severely taxing the capacity of the rolling stock. This coffee is being warehoused at Agudos, Rubião Junior, and Presidente Altino, until the official opening of the Mayrink branch, when it will be railed to the port of Santos.

Gross earnings of this railway for the first eight months of 1937, amounted to 82,236 contos, an increase of 5,855 contos over the figure for the corresponding period of 1936. Operating expenses (62,568 contos) advanced by 2,891 contos, so that net earnings were 19,669 contos, a sum which was 2,965 contos higher than 1936.

Central Railway

Passengers on the Rio de Janeiro suburban section have increased considerably since the inauguration of electrification on July 11. Up to September 10, 5,916,000 passengers were carried, receipts being 2,266 contos. This compares with a movement of 4,556,000 passengers carried by steam trains during the same period last year, when receipts amounted to 891 contos.

Estrada de Ferro Victoria a Minas

The programme of purchases, and works, to be undertaken on this railway against the account of the 10 per cent. improvements fund during the three years ending 1941, and recently approved by the Minister of Transport, comprises:—

	Cost Contos
Acquisition of 2 articulated locomotives	1,600
Acquisition of 40 to 60 closed wagons	1,400
Acquisition of workshop machinery	1,000
Construction of a station at Anna de Mattos, and depot at Desembargador Drummond	200
Total	4,200

CHILE

Materials for State Railways

According to advices from Santiago, the Chilean Government, through the Ministry of Production, has confirmed the order given by the State Railways administration to a United States firm for 16,615 tons of rails and 690 tons of other railway equipment, to a total value of U.S. $1,176,000. The materials will be delivered in four shipments during 1938 and 1939.

Projected New Railways

Information from Santiago is to the effect that the Director of Public Works has ordered surveys to be made for the construction of the two new railways from Peralillo to Parral—90 km. long—and from Peralillo to San Vicente—30

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km. long—both in the Province of Colchagua.

INDIA

Railway Budget

The Railway Budget is to be introduced in the Central Legislatures on February 18, and in this connection certain disturbing factors—notably the reduced traffic in cotton and wheat—make it unsafe to speculate upon improved receipts during the present financial year. It is, however, confidently expected that the earnings for the last four months of the year will at least be maintained at the level of the previous year. The working expenses for the first half year were only about Rs. 11 lakhs more than in the first six months of 1936-37, though the traffic handled this year has yielded an increase of over Rs. 300 lakhs. This has been possible only by the steady pursuance of the economy drive initiated in 1931. Between 1930-31 and 1936-37, ordinary working expenses have been reduced by over Rs. 5·75 crores (£4,312,500) p.a. in spite of the fact that the traffic receipts in 1936-37 were slightly more than in 1930-31.

Transport Advisory Council

The Transport Advisory Council sat at New Delhi on December 10 with Sir Thomas Stewart, Member for Communications, in the chair. In addition to a number of officials of the Government of India, the gathering included Mr. Tylden Pattenson, Member, Railway Board; Provincial Ministers in charge of local communications, and representatives of the Indian States. It is understood that a sub-committee of the council has been appointed to examine and report on the draft Motor Vehicles Transport Bill in the light of the resolutions adopted by the Transport Advisory Council in previous meetings.

C.P. Board of Communications

The Government of the Central Provinces has appointed a Board of Communications consisting of 15 official and non-official members. The Great Indian Peninsula and Bengal-Nagpur Railways will be represented on the board.

Meghna Bridge Opening

At the opening of the Meghna bridge [reported on page 1036 in our issue of December 10—Ed. *R.G.*] Mr. G. E. Cuffe, Agent of the Assam-Bengal Railway, gave some details of its construction and explained the numerous advantages it would bring both to the public and to the railway. The new bridge, he said, enabled the public to travel between Dacca and Mymensingh on the one hand, and Chittagong and southern Assam on the other, without transhipment and in much shorter time than before. Moreover, it enabled the railway to economise by elimination of the expensive wagon ferry and passenger steamers, and also by the more efficient utilisation of stock. The original estimate of Rs. 56 lakhs (£420,000) had not been exceeded and the Agent expected that the savings effected in operating expenses would give a return of over 6 per cent. on the capital outlay. The speed with which the bridge had been completed was, he said, remarkable. In the original estimates a period of three working seasons was allowed, but actually, the first well-curb was placed in position on November 25, 1935, and the first engine ran over the bridge on August 30, 1937, *i.e.* 21 months and 5 days later. Mr. Cuffe suggested that this was probably a record for a bridge consisting of seven 334-ft. and six 105-ft. spans, especially when it was borne in mind that the high level of the water in the river between June and November, 1936, had greatly hampered the progress of the work.

Mr. Cuffe emphasised the essentially Indian character of this bridge, which was built with Indian cement, stone, and steel. The steelwork was fabricated in India to standards of accuracy which, he said, could be surpassed by no other country in the world. He paid high tributes to the Burn, Braithwaite & Jessop Construction Company which fabricated the steelwork, and to the Hindustan Construction Company for the work done at the bridge site.

Sir Guthrie Russell, Chief Commissioner of Railways, who opened the bridge, thanked Mr. Cuffe on behalf of the Government of India and the Railway Board, for his share in adding to the railway system of India another great monument of engineering skill, a monument built almost entirely from India's own resources.

EIRE

Holidays with Pay

It is stated that the proposed holidays with pay will affect a very large number of workers in Eire, formerly known as the Irish Free State, who, with their wives and families, offer an appreciable potential increase in traffic to the railway companies, and undoubtedly will affect the hotels and lodging houses in the holiday resorts. As many holiday resorts are, however, already full to capacity during July and August, the problem of providing additional accommodation will become acute unless it is found feasible to arrange that the holidays shall be spread over the whole period from May to September, inclusive. It would also be very efficacious if firms that find it advisable to close down entirely for a week, should avoid doing so in July or August.

The railways are already arranging to canvass firms and business houses to induce their employees to form clubs for holiday purposes. No doubt the stamp system of saving in force in England, which is on the increase, will be open to adoption, and it is hoped that, to encourage this practice, it will be found possible to induce the employers to stock and sell the holiday stamps direct to the workers, or to persuade them to make voluntary deductions from their pay for holiday purposes.

A considerable amount of immediate organisation must be undertaken by the railways to secure their share of this potential traffic during the coming season, and it will be necessary to ascertain what accommodation will be available, also costs and other particulars.

No scheme which will draw holiday-makers to the railway must be overlooked, and in this connection a lesson may be learned from the booksellers who provide book tokens. A similar token, which might be called a "Holiday Token," might be supplied to shops in multiples of 2s. 6d. or other suitable sums. They would have the effect of providing another aspect of the stamp system and of encouraging saving, and would provide a praiseworthy opportunity to those who wish to make presents to relatives and friends.

VICTORIA

Government Railways Locomotive Programme

Victorian railway workshops have for the past six years been employed entirely upon the repair and rebuilding of locomotives, repairs of other stock, and the construction of standard steel wagons. As a result there is now a slight shortage of locomotive power, and twelve new freight engines and one passenger locomotive were sanctioned in 1936. The former are of the standard "X" class, and the first was delivered in January, 1937. They are similar to the earlier engines of the class, but have the modified front end and modified Belpaire type boiler. Seven of these redesigned locomotives are at present under construction at Newport, and have all-welded tenders.

New Heavy 4-8-4 Type Passenger Engine

To haul the increasingly heavy Adelaide express and other trains on the western main line—including the 131 miles between Melbourne and Ararat with its 15-mile 1 in 48 Islington bank—a new 4-8-4 passenger engine has been designed, and the construction of one engine of this type is expected to be begun at an early date. Known as the "H" class the new type will be considerably more powerful than any existing engine on the system.

A modified Belpaire boiler, generally similar to Pennsylvania Railroad design and of all-steel construction, with a mainly welded firebox, is incorporated; also bar frames and three

cast-steel cylinders of moderate dimensions, of which the inside will drive the leading, and the outside the second pair of coupled wheels, 5 ft. 6 in. in diameter. The coupled axle load will be 23½ tons, and the firebox, with its 66-sq. ft. grate area, will be carried on a Commonwealth cast steel bogie truck, fitted with a booster driving the trailing pair of wheels. A Dupont mechanical stoker and cast steel alloy pistons are included for the first time in a Victorian locomotive.

Large piston valves, actuated by outside Walschaert gear, are provided, and the inside valves will be driven by a conjugating gear similar to that on the Madrid-Saragossa-Alicante three-cylinder 4-8-0's, a type that is claimed to have certain advantages over others. The estimated tractive effort is 62,000 lb. with, or 53,000 lb. without the booster. The over-all length of the engine and all-welded, 12-wheel tender is 95 ft.

Extensive Locomotive Modifications

All locomotives of the "C" and "S" classes have now been rebuilt with the very successful front end modifications, and two-thirds of the "A" class and many of the "D3" class have also been similarly modified, with the addition of smoke deflector plates. In addition, a beginning has been made with the modification of the "X" and "N" class engines; altogether 221 locomotives are now running in modified form.

Rapid Spread of Air-conditioning

Three more passenger cars are being converted to air-conditioned buffet cars, and four new ones are under construction; the latter will be similar in design to the Cor-ten steel cars of the "Spirit of Progress" streamlined train. All new passenger cars for express working will in future be air-conditioned, and more existing cars are being converted. The first air-conditioned second class and sleeping cars in Australia were placed in service some months ago on the Mildura express, a first, a second class and a sleeping car forming the first completely air-conditioned train, which runs three times weekly in each direction.

Welded Wagon Stock

Welding has been extensively used in all freight rolling stock construction during the past five years, and a large number of all-welded steel four-wheel gondola cars, with a capacity of 27 tons, have been built. These cars will be used for wheat when its transport in bulk comes into force for the 1938-39 harvest. Over 100 ventilated perishables vans and 50 cattle trucks have also been built, and the following all-welded Cor-ten steel vehicles are authorised in the 1937-38 programme: 50 perishables vans and 50 sheep trucks. Two 100-ton breakdown cranes are projected.

NEW ZEALAND

Improvements during Current Year

The Hon. D. G. Sullivan, Minister of Railways, has announced the programme of railway development in New Zealand arranged for the current financial year. The following major improvements are planned:—

(1) Electrification of the Wellington-Johnsonville line.

(2) Electrification of the North Island main line section from Wellington *via* the Tawa Flat deviation to Paekakariki.

(3) Air-conditioning equipment to be fitted in the ordinary and sleeping cars of express trains throughout the Dominion.

(4) Completion of several deviations to effect smoother running for trains and reduction of operating costs.

(5) Progress with Christchurch new station and yard reorganisation at that centre.

(6) Elimination of a number of the more dangerous level crossings and other efforts to increase public safety, including completion of the important ramp for an alternative road outlet between Wellington and the Hutt Valley.

(7) A large increase in the number of passenger cars and goods and livestock wagons available for the coming busy season.

(8) Further development of the automatic train control system to make centralised train control more effective.

The Minister also stated that construction works of many kinds throughout the Dominion, particularly in the provision of rolling stock requirements, have been delayed during the past year through inability to obtain materials from abroad, but that the New Zealand orders are now coming to hand more satisfactorily.

Rolling Stock Programme

Several of the railway workshops are to be extended to meet the demand for increased rolling stock. As an example of what is to be done at one of these, it may be mentioned that a schedule of works involving the construction and reconditioning of about 2,000 goods and passenger vehicles is to be undertaken by the staff at the Otahuhu (Auckland) railway workshops during the current year. The complete programme is so large that the staff of fully 1,400 men—the biggest in the workshops' history—and the accommodation at the shops, are inadequate to cope with the timetable laid down for completion of the wagons and carriages.

Not only have increasing rail traffics necessitated a steadily increasing number of employees at these shops, but the demands from other State departments have also contributed to the pressure of work. The workshops recently completed the last of a number of buses which are to be used by the Education Department in conveying country children to and from school, and the joinery staff is at present engaged in making the furniture for the offices of the new station at Wellington.

The carriage-building staff is meantime working on 11 new second class passenger coaches, and they, with four new first class carriages, are due to be completed very early. In addition to the ordinary repair work on rolling stock, the staff is carrying out extensive reconstruction work on old-type passenger carriages. After being stripped to the frame, the carriages are being rebuilt and fitted with an improved type of seating of the most modern design. There are also to be constructed in the current working year 24 first and 33 second class coaches and six semi-sleeper coaches.

Roller Bearing Bogies to be Standard

The most modern engineering and furnishing methods are to be employed in the construction of the new coaches. All bogies will be equipped with roller-bearing fittings, and the seats in the first class cars will be of the single-unit type, which revolve and tip in three different postures. The interior finish in several coaches will be in rexine cloth, and with the leather upholstery of the seats, will resemble the modern motor-car in appearance and style.

The development of the chilled beef industry has resulted in a growing demand for the special type of wagon designed for this trade. More than 30 of these vehicles are to be constructed and delivered within the next few months. The new programme includes over 1,800 goods and livestock wagons of all types.

New Line to be Constructed

A new railway line joining Paeroa, the junction of the Thames and Tauranga district railways, with Pokeno (40 miles south of Auckland on the North Island main trunk line) has been decided upon by the Government, and £75,000 has been provided in the estimates towards its cost during the current year. The new line will benefit every town and every farm served by the 111 miles of railway between Paeroa and Taneatua, to say nothing of Thames and its district. It will bring the port of Auckland, with its warehouses, fertiliser works, stock-yards, and meat works 50 miles nearer. The fat stock industry of the Bay of Plenty especially will benefit. Further, it will have great settlement and production value for the central area of the Hauraki Plains, and will give a new and necessary balance to the railway system of the province, and aid the railway management in easing congestion at Frankton, saving haulage and in reducing demands on rolling stock. There will be a substantial gain in passenger traffic, much of which is now lost to the railways because of the waste of time and the high fares due to the extra 50-mile lead. Paeroa will be brought as near to Auckland as is Hamilton.

Tauranga and other seaside resorts of the Bay of Plenty will receive more holiday-makers when the direct route is open, and the construction will provide useful work for the unemployed.

XUM

ATOMISER CYLINDER LUBRICATION FOR LOCOMOTIVES

A system now being fitted to engines on the L.M.S.R.

THE use of highly superheated steam for locomotives involves the necessity of improving lubrication methods for the valves and cylinders. For some considerable time past, one or other of two systems has been utilised—either a mechanical lubricator pumping oil directly to the points in the cylinder requiring lubrication, or a displacement lubricator, by which the oil is delivered into the steam pipe at a point just before it enters the cylinder, whence it is carried forward by the action of the steam itself, and deposited on the points requiring lubrication. It is held by many locomotive engineers that the first of these systems has very definite advantages. The mechanical lubricator, usually placed in an accessible position on the engine, can be easily filled, and can be adjusted in the works to deliver a pre-determined amount of oil to every point to be lubricated; and so long as there is oil in the lubricator, and the driving mechanism from the motion and the pipelines are intact, reliable oil delivery is assured at all times, without any attention being required on the part of the driver. This is particularly valuable in the pooled working which economic circumstances have made so widely necessary at the present time. It is further of advantage that once the lubricator has been set as described, there is no need to alter the adjustment.

The displacement lubricator, on the other hand, has an advantage not possessed by the normal form of mechanical lubrication, in that the oil, instead of being delivered on to the rubbing surfaces in the form of globules issuing from the pipeline, is well mixed with the incoming steam in the form of an oil vapour, and as such is deposited on the rubbing surfaces in a more evenly distributed form. It is with the object of combining the best points of the two methods of lubrication outlined, that the atomiser valve as illustrated and described herewith has been developed for use in connection with the mechanical lubricator on locomotives of the L.M.S.R. The drawing, Fig. 1, shows diagrammatically the disposal of the different parts comprised in the arrangement. Briefly, the atomiser valve *C* is introduced in the pipeline between the mechanical lubricator and the steamchest oil inlets. In this valve, the oil meets steam coming from a boiler stop valve *A*, through the control cock *B*. Here the oil is broken up into extremely small globules in the manner of which details are given below, and is then carried forward by the steam as a kind of spray or oil mist, and delivered in this form through small holes in the periphery of the steamchest liner, so disposed that the incoming steam blows it on to the working surfaces of the valve and piston.

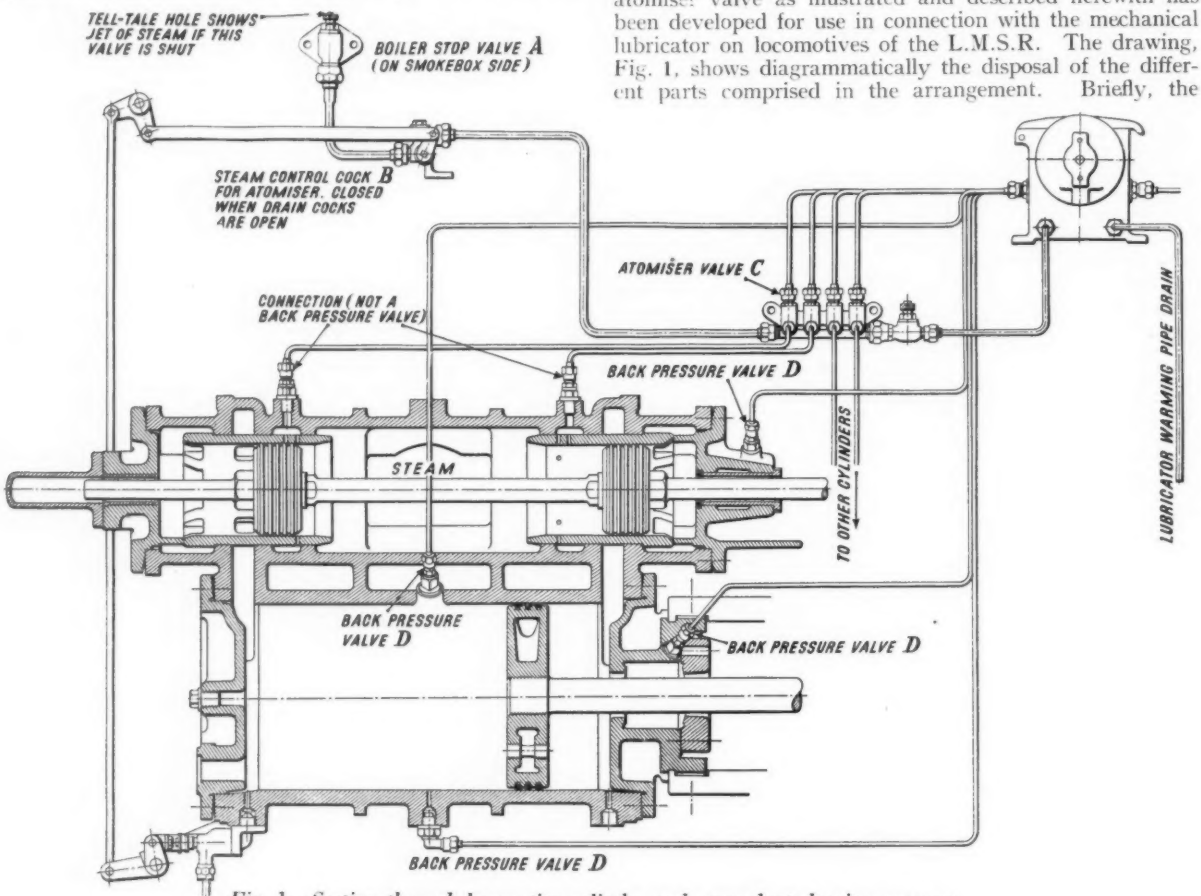

TELL-TALE HOLE SHOWS JET OF STEAM IF THIS VALVE IS SHUT
BOILER STOP VALVE A (ON SMOKEBOX SIDE)
STEAM CONTROL COCK B FOR ATOMISER. CLOSED WHEN DRAIN COCKS ARE OPEN
ATOMISER VALVE C
CONNECTION (NOT A BACK PRESSURE VALVE)
BACK PRESSURE VALVE D
STEAM
TO OTHER CYLINDERS
LUBRICATOR WARMING PIPE DRAIN
BACK PRESSURE VALVE D
BACK PRESSURE VALVE D
BACK PRESSURE VALVE D

Fig. 1—Section through locomotive cylinder and steamchest showing arrangement of atomiser lubrication system

A detailed diagram of each of the parts employed, is shown in Fig. 2. The boiler stop valve *A* is usually placed on the side of the smokebox, and represents the master valve controlling the inlet of steam into the system. Its normal position is fully open while the engine is under

steam, and a tell-tale hole is incorporated in the valve, so that if the latter has inadvertently been left closed, the driver has immediate evidence that this is the case, and there is, therefore, no possibility of the engine running for any length of time without the necessary steam supply to the atomiser. The steam, on its way to the atomiser, passes through the control valve *B*, which is coupled up to the cylinder drain cock gear in such a way that it is in a closed position when the cylinder drain cocks are open. A notice exhibited in the cab of the locomotive instructs the driver that these cocks must be open every time the engine is brought to a stand, but if for some reason this notice should be ignored, it is still possible to prevent pressure building up in the steamchest by fitting a small ball-type pressure release valve on to the cylinder air valves, which are directly connected to the steamchest. These release valves open automatically when the engine regulator is closed.

It will be seen from the drawing that the control valve is of very simple and sturdy construction; a small mushroom valve is lifted from its seat by a rocking cam formed on the spindle of the valve. A short lever on the spindle end is coupled by suitable rodding to the cylinder cock gear, and a return spring bears on the top of the steam valve to ensure that it will remain firmly seated even in the absence of any steam pressure upon its upper face; consequently, it must always bear upon the face of the cam.

The atomiser *C* itself takes the form of a casting which may embody four or more individual atomiser valves, according to the number of cylinders on the engine. This valve is usually bolted to a suitable bracket on the footplate, so placed as to keep the respective pipelines as short as possible. Oil is delivered into the top union of any one of the valves, from the mechanical lubricator, and this inlet is normally closed by a ball which is forced upwards on to its seating by a spring. Pressure generated by a pump in the mechanical lubricator overcomes the effect of this spring, and oil is allowed to enter the mixing chamber. Steam delivered through valves *A* and *B* is also led into this mixing chamber. Owing to the circular shape and the angles of the ports through which the oil and steam are introduced, a violent swirling motion is imparted to the steam and oil in this chamber, resulting in a very thorough mixture of the two. The atomised mixture finally passes forward through the horizontal union for delivery to the steamchest, whilst in the steamchest itself the atomised mixture is delivered into a port in the cylinder casting, which surrounds the periphery of the piston valve liner at its inner end. Small holes are drilled radially through the liner at this point, so that the atomised oil is blown into the steamchest at a number of points in the periphery. The effect of the incoming steam at the main steam pipe is such that the oil is carried forward towards the piston valve heads, and down into the steam ports into the cylinder, when these are opened by the movement of the piston valve.

The arrangement described ensures that a consistent volume of oil is deposited on the working surfaces of the valves and piston, so that the wear of these important details is reduced to a minimum. It is, at the same time, found that less carbonisation is formed on the valves and pistons than is the case with mechanical lubrication working without atomisers. It will be noted from the general arrangement drawing that only the oil delivered to the steamchest is subjected to atomising. Experience has shown that no advantage is derived from dealing in this way with the oil delivered to the stuffing boxes and to the cylinder barrels, and consequently these parts are fed directly from a mechanical lubricator through a normal type of back pressure valve marked *D*, and shown in section in Fig. 2.

Our thanks are due to Mr. W. A. Stanier, Chief Mechanical Engineer of the London Midland & Scottish Railway, for the above information, and for the originals from which the illustrations have been reproduced.

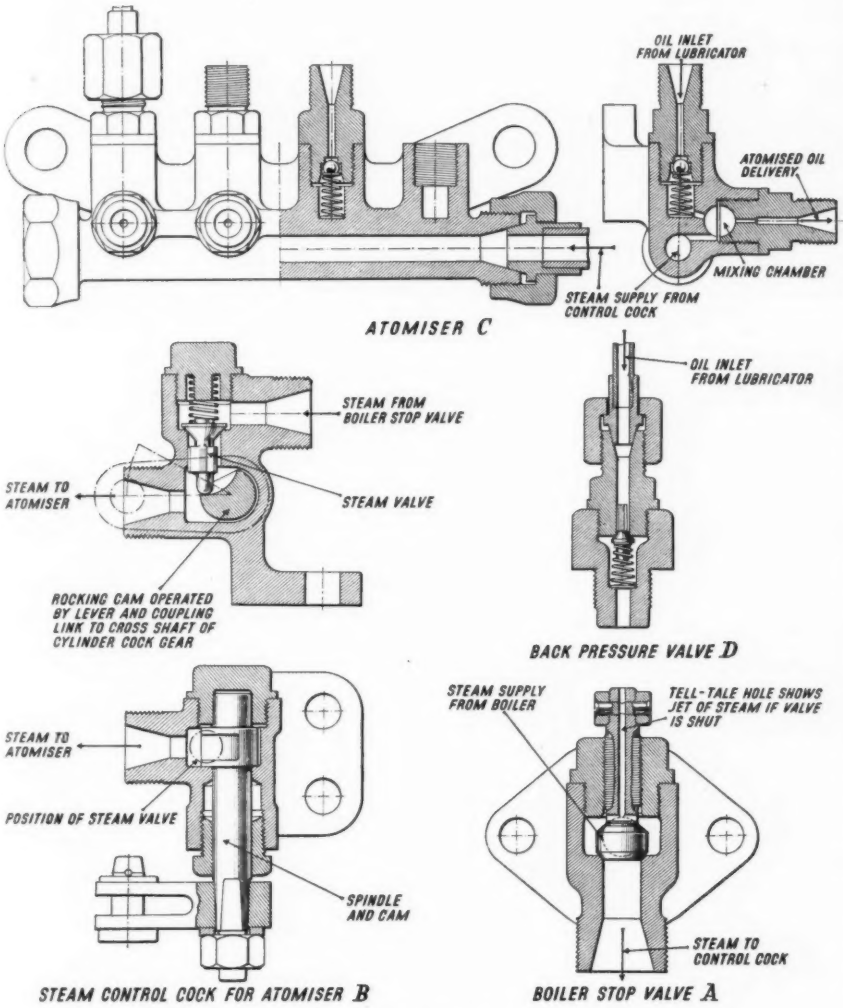

OIL INLET FROM LUBRICATOR
ATOMISED OIL DELIVERY
MIXING CHAMBER
STEAM SUPPLY FROM CONTROL COCK
ATOMISER C
STEAM FROM BOILER STOP VALVE
STEAM TO ATOMISER
STEAM VALVE
ROCKING CAM OPERATED BY LEVER AND COUPLING LINK TO CROSS SHAFT OF CYLINDER COCK GEAR
OIL INLET FROM LUBRICATOR
BACK PRESSURE VALVE D
STEAM TO ATOMISER
POSITION OF STEAM VALVE
SPINDLE AND CAM
STEAM CONTROL COCK FOR ATOMISER B
STEAM SUPPLY FROM BOILER
TELL-TALE HOLE SHOWS JET OF STEAM IF VALVE IS SHUT
STEAM TO CONTROL COCK
BOILER STOP VALVE A

Fig. 2—Details of atomiser, valves, and other parts

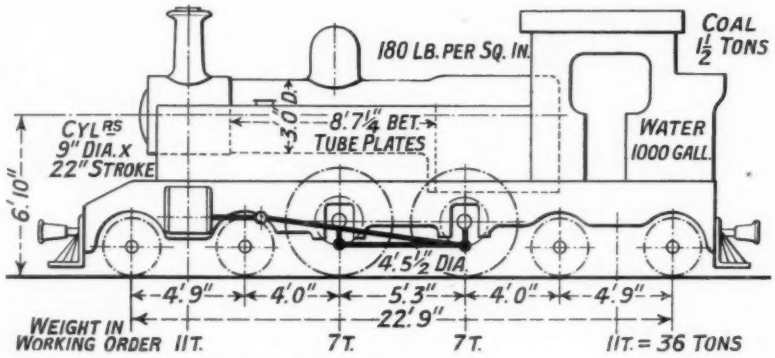
NEW NARROW GAUGE TANK ENGINES FOR INDIA

A lightweight design to which these 4-4-4 type engines will be built at the B. B. & C. I. Ajmer shops

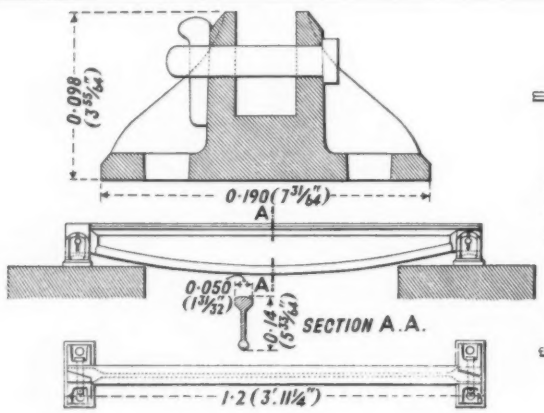
DESIGNS for a new tank locomotive are approaching completion at the metre-gauge locomotive drawing office of the Bombay, Baroda & Central India Railway at Ajmer. The wheel arrangement, as shown in the accompanying drawing, is 4-4-4, and the engines will be known as Class "A." The construction of 10 engines of this class is under consideration, for passenger services on short branch lines, where a fast and frequent service is required. Sections of these lines are laid with worn 41¼-lb. rails, on which only light axle loads are permissible, and this limitation has been observed in the design of the new engine which has a maximum axle load of 7 tons.

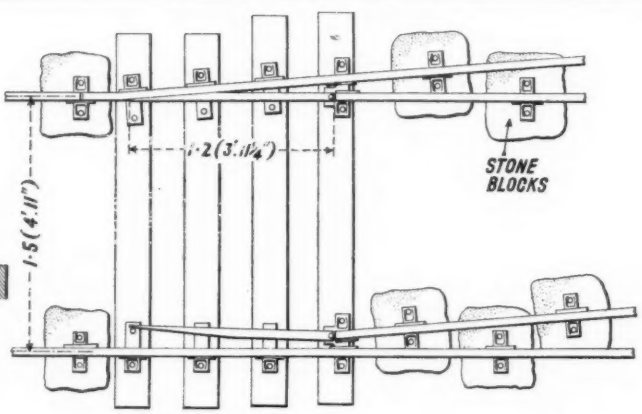
The cylinders, which drive the second pair of coupled wheels, are placed outside the frames, and steam is distributed to them by superimposed piston valves actuated by Walschaert gearing. The boiler has a diameter of 3 ft. 0 in. outside, and the firebox is of the Belpaire type, the lower portion being narrowed to go between the frames which are 2 ft. 9¼ in. apart.

The leading particulars are given opposite.



Cylinders (2), diameter × stroke	9 in. × 22 in.
Coupled wheels, diameter	4 ft. 5½ in.
Boiler pressure	180 lb. per sq. in.
Heating surface :	
Tubes, large	227·38 sq. ft.
,, small	83·7 ,,
Firebox	64·1 ,,
Total	425·18 ,,
Grate area	10 ,,
Tractive force at 85 per cent. boiler pressure	5,096 lb.
Ratio of adhesive weight to tractive force ..	6 : 1
Total weight of engine in working order ..	36 tons.

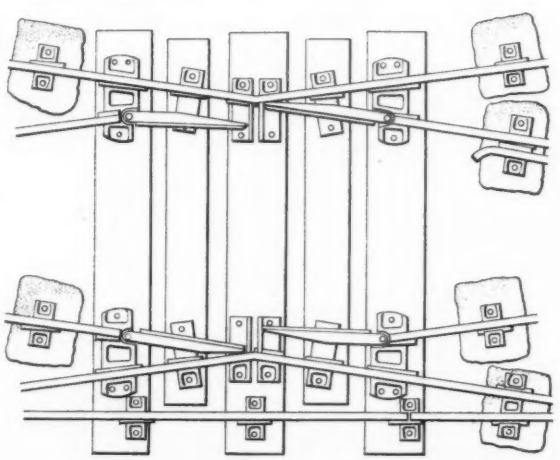




Top, left: Type of stone track used in 1828 on the St. Etienne-Andrézieux Railway. The rails were of cast iron, 1.20 m. long, each weighing 2.50 kg. They had chamfered ends and were joined in cast iron chairs, each weighing 3 kg. and supported on stone blocks

Top, right: Points used in 1832 on the St. Etienne-Lyons Railway

Right: Movable diamond crossings in use in 1838 on the St. Etienne-Lyons Railway



EARLY FRENCH PERMANENT WAY

RAILWAYS AND ROAD TRANSPORT SECTION

This section appears at four-weekly intervals

Indian Railways' Road Policy

ONE of the first fruits of the appointment by the Indian Railway Board of two special officers to consider and co-ordinate the replies of the various railway administrations to questionnaires based upon the recommendations of the Wedgwood Committee,* appears to be a decision by the board to encourage certain railways to run their own road services, and also to close down some unremunerative branch lines where road services can be more economically run without prejudicial effects upon the areas served. These steps will be taken in addition to the inauguration of bus or lorry services intended to open up new areas and act as feeders to the railways, such as that recently launched by the East Indian Railway, and described in our issue of August 27 last. Meanwhile it is gratifying to note that the Punjab Government has drawn up an eight-year road development programme, involving a sum of Rs. 1,25,00,000 (or nearly £1 million), one-quarter of which is earmarked for roads intended to reduce road-rail competition, and not less than 25 per cent. for feeder roads to railways. At the end of the eight years this Province should possess 4,000 miles of tarred and metalled roads, in addition to 10,000 miles of unmetalled motorable roads, and it is of interest to note that, due to extensive tarring, it is hoped that the cost of maintenance will not exceed the present figure of Rs. 48,00,000 (£360,000) p.a., in spite of the expansion involved in this programme.

Competition in South Africa

IN the report of the Central Road Transportation Board for the year ended March 31, it is stated that the public interest should be the primary consideration in the railroad problem, but the individual should be protected from exploitation. The transport costs should be borne neither by the individual carrier nor by the community, as the general taxpayer, but by the user of transport. This aim, states the report, can best be attained by State control of all forms of transport, as this means of control can impose certain restraints, not only on transport undertakings, but also on the users and the public. The assumption, of course, is that there is a real scarcity of transport, and it must therefore be protected from waste. This assumption is generally accepted as necessarily true. In South Africa it is held to be essential to protect the railways from competition in the transport sphere to which they are best suited, otherwise the taxpayer will be made to bear the consequences. Similarly, private transport operations must be protected in their sphere of operation from wasteful competition. The basis of a system of co-ordination should, according to the report, be a fair division of function and not a fair basis of competition, and this is now realised by the issue of three distinct licences based on the distance over which the traffic has to be conveyed. The South African Railways as a "public service," belong to the community, and are obliged to carry traffic irrespective of the class of goods or the distance involved and subject to classified rates. Such a transport undertaking cannot fulfil its "public service" obligations unless it is afforded protection from uncontrolled competition. The report says that the tendency is towards the creation of a Ministry of Transport, an effective and uniform system of co-ordination being necessary, and the lack of uniformity in motoring regulations and in taxation in the different provinces being a grievance of long standing. The operations of non-European taxis are still causing grave concern to the railway administration and other authorised services. These taxis, most of which are the property of Indians and natives with no financial standing, are reported to be running more or less regularly over routes which are served by rail or certified buses, and their owners have great advantages over the authorised services, as they are not required to observe timetables, charge fixed fares, nor pay insurance premiums, to say nothing of the costs of railway maintenance and operation. The number of motor carrier certificates issued by the board has increased from 3,641 in 1933 to 5,940 in 1936.

* As recorded in an editorial note on page 54.

The Future of the Trolleybus

OPINIONS are sharply divided as to what future, if any, the trolleybus has in the sphere of urban transport a decade or so hence, and it has been pointed out on more than one occasion that practically all decisions to adopt trolleybuses have borne in mind considerations other than those of engineering and traffic efficiency. In this country it is noteworthy that the chief protagonists of trolleybuses are those authorities already possessed of electrical equipment and staff, such as tramways and municipal electricity supply undertakings. The question has been raised once more by a comprehensive report which has been submitted by Mr. Ben England, the Transport Manager to Leicester Corporation, on the subject of the city transport services. In this report Mr. England urges the change from trams to motorbuses by degrees, and in putting forward this recommendation emphasises how vital it is that transport should be dealt with as transport only and that extraneous considerations such as the continued purchase of electricity ought not to enter into the matter. He refers to the consequences of unwisely saddling the Transport Department with trolleybuses partly in the interests of the electricity department, and says that he has not heard of any other case in the country in which an electricity department has attempted so directly to interfere with the work of the transport section. Whether Mr. England's expression of opinion regarding municipal conditions at Leicester is correct, is not a matter upon which we would venture an opinion, but his comments emphasise an inter-relation between the various trading activities of some municipalities that is held by a large number of transport experts to account partly for the introduction of trolleybuses rather than motorbuses when trams are replaced.

It may be recalled that just over a year ago Mr. A. D. Mackenzie, Director and Traffic Manager of the South-

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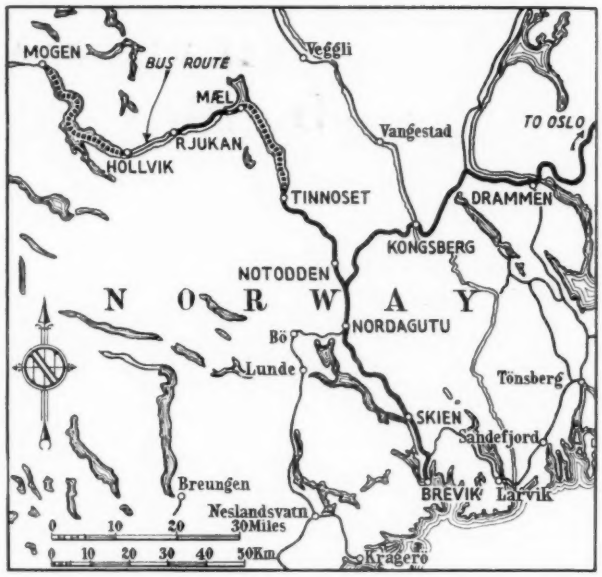
down Motor Services Limited, referred at some length to the subject of trolleybuses in the speech he made at the coming-of-age celebrations of his company. He then said that although it would be a bold man who ventured to prophecy what would be the transport of the future, he did not think that the trolleybus would have a very long life, as it was neither fish, nor flesh, nor even good red herring, although it had been used as red herring to a very great extent. The fact was that many transport undertakings were saddled with a contract to take so many units of electric current annually and were obliged to use these until the expiration of the contract. Moreover, he pointed out, such transport undertakings had a large staff of men trained in the driving and maintenance of electric tramcars, who did not understand internal-combustion-engined buses and could be better used on trolleybuses. For that reason he felt that trolleybuses were being used as an intermediate step between the tramcars and the motorbus, and that at the end of the life of the present vehicles—say 10 years hence—or at the expiration of an electricity contract, it was probable we should see trolleybuses replaced by motorbuses. Moreover, he was sure that the public would like to see the removal of overhead wires, and the transport on our roads dealt with by independent self-contained vehicles.

Mr. Mackenzie's lengthy and extensive experience of passenger road transport naturally adds great weight to his expression of opinion, and we think it unlikely that any of the large railway-associated motorbus companies in this country will embark upon trolleybus enterprises. Actually, the railways have shown no inclination to invest money in electric traction on the roads, and where their associated companies are interested in tramways (or in the case of the Maidstone & District, the trolleybuses at Hastings), the electric activities have always been small in proportion to the whole enterprise, and in many cases have been discontinued subsequently in favour of internal-combustion-engined buses.

Co-ordination in Norway

NORWAY, of all European countries, is probably where the co-ordination of different systems of passenger transport has been carried to its greatest degree of practical utility. It is true that combined through services of train and motorbus, with through bookings and timed connections, have been instituted in this country within the last year or two, but in Norway this is the general practice throughout the country, and most of the regular passenger road services (except of course urban or suburban bus traffic) are timed to run in regular connection with the scheduled railway services, road vehicles running on fixed timetables and leaving or arriving at railway stations immediately after or before the train times. Moreover, this system is extended also to the ferries and steamer or motorboat services of the fjords and inland waters. Hence the traveller in Norway uses not a "railway" guide but a "communications" guide, in which by means of a map and cross references he is enabled to arrange his journey, making use of rail, road, and water transport as may be indicated.

Many examples might be quoted of the working of this co-ordination system. There is the Oslo—Bergen route, on which no fewer than twelve regular daily motorbus services connect with the trains at different stations along the route. Or take the case of the traveller wishing to go to Rjukan (noted for the production of nitrates from the atmosphere). From Oslo, or from the port of Brevik, he can go by train to Tinnoset, where a boat connection awaits the arrival of the train. A journey of two hours up the lake brings him to Mael, and here, again, a train connects



with the boat, and takes him on to his destination. Should he wish to go further to Hollvik a bus will take him on after a 20-min. wait, and on certain days during the summer a motorboat connection provides transport up the lake to Mogen. Any number of these train-omnibus or train-boat connections might be quoted, and obviously the natural configuration of the country must have played a large part in the evolution of the co-ordination. Even so, and although conditions in Great Britain are admittedly different, it would seem that the public convenience might be better served and the revenue of the companies increased, by a well-studied extension in the co-ordination of road and rail services. Incidentally, departure timings from principal stations in Norway, and often arrivals also, are fixed at even times, readily memorised by staff and by passengers. For instance, on one of the principal main routes from Oslo, that originating at the West station, the through trains leave at 8.0, 13.0, and 18.0, and the corresponding up services are timed to arrive at 12.0, 17.0, and 22.0.

Road Services and Wagon Release

HOW smart road service can assist smooth and efficient railway working was shown in a recent issue of *On Time*, the journal of the L.M.S.R. Operating Department. Discussing the release of wagons from stations, and the fact that if every goods station on the L.M.S.R. could release one more wagon a day the whole system would have 2,000 extra wagons available for traffic, *On Time* records an achievement of Sharnbrook station, Bedfordshire, in this direction. On a day when the quick release of wagons for profitable employment elsewhere was particularly desired, the single two-ton lorry attached to Sharnbrook made 18 trips, covering 66 miles, in a working day of 10 hr. 45 min. In that period a total of 39 tons 9 cwt. was conveyed, and although full loads were carried on 13 of the trips the time spent at the station on no occasion exceeded 10 min. The traffic dealt with was leather grain. Collection and delivery was instituted experimentally at Sharnbrook four years ago, covering a radius of five miles and serving nineteen villages. The scattered nature of the district naturally leads to high road mileages, and subsequent to the energetic day just recorded the motor lorry at Sharnbrook covered 385 miles in a working week in the course of collecting and delivering 127 tons of traffic.

The Road Fund Report, 1936-37

THE report of the administration of the Road Fund for the year ended March 31, 1937, which was recently published, covers such matters as the receipts, payments, and commitments of the Road Fund; the grants made in the current twelve months towards road improvements; the progress made in road, bridge, and tunnel construction; and the administrative action taken by the Minister of Transport under various Acts of Parliament. The total receipts of the Road Fund in the twelve months under review were £27,992,522, of which £27,427,000 was derived from motor taxation receipts (after deduction of the Treasury proportion), while the total payments from the fund were £28,203,877. These included £14,799,038 in grants towards the cost of road works; £6,458,573 paid towards the General Exchequer contribution in respect of road grants discontinued under the provision of the Local Government Act, 1929; and £5,250,000 paid to the General Exchequer under the Finance Act, 1936. It is interesting to find that the total amounts paid into and from the fund for the period in question were the highest for the last eight years, the payments representing an increase of nearly £3,000,000 over the previous twelve months.

Road Fund Commitments

The cash balance of the Road Fund on March 31, 1937, was £5,567,364 and the estimated commitments of the fund at that date £52,239,000, of which no less than £37,317,000 is in respect of improvements under the five-year plan 1935/40, while £6,724,000 is in connection with long-term schemes. The programmes submitted by highway authorities up to March, 1937, under the five-year plan envisaged an expenditure of £144½ millions, and at that date schemes estimated to cost £73,312,000 had been accepted in principle for grant purposes, the Road Fund contribution being approximately £43,881,000.

Taxation of Road Vehicles

For the calendar year 1936 the gross receipts from the taxation of road vehicles were £32,320,043, an increase of 6·04 per cent. over 1935. The number of mechanically propelled vehicles rose by 7·27 per cent. to 2,768,606 during 1936, while the number of horse-drawn vehicles declined by no less than 20·65 per cent. to 14,915.

Cost of Licensing System

An analysis of the Road Fund accounts shows that in the twelve months ended March, 1937, the expenditure on the administration of the passenger and goods vehicle licensing system (£586,396) exceeded the receipts (£427,278) by £159,118, as compared with £131,832 in the previous twelve months. On the other hand, the receipts from driving tests under the 1934 Act amounted to £126,849 and the expenses £68,280, showing a profit of £58,569, as compared with about £20,000 in 1936.

Statistics

The detailed statistics appended to the report show that during the year 338,000 driving tests were conducted by the Ministry's examining staff, and in about 95,000 (or about 28·1 per cent.) of these tests the candidate failed. The necessity for these tests is amply demonstrated by the fact that the number conducted from the inception of the regulations in 1935 to March, 1937, was 584,000, while the failures totalled 137,000, representing 23·4 per cent. of the total.

The total mileage of classified and unclassified roads at March 31, 1937, was 179,000, of which about 40,350 miles are subject to a 30 m.p.h. speed limit. In connection with the various schemes of road improvement 1,168 miles of footway were constructed, super-elevation provided on 7,017 bends, 4,793 " halt " signs erected, 2,093 road junctions improved, and 500 sets of pedestrian guard rails installed. During the year also, 188 traffic control light signals were installed, of which 159 were traffic actuated, 28 dually operated by traffic and pedestrians, and one was a fixed time cycle installation. In addition, 28 fixed time cycle installations were converted to traffic-actuated lights. The engineering details of 662 bridges, 192 retaining walls, and 24 pipe culverts were examined in connection with applications for grants from the Road Fund by local and other authorities.

Highway Survey of London

A somewhat unusual investigation has been undertaken in order to obtain reliable figures as to traffic delays occurring at various points on four of the principal routes through London at various times of the day throughout a typical week. These reveal that a motorist can expect to make the entire northern circuit of London *via* the North Circular Road, a distance of 22·75 miles, in somewhat less time than he would spend in threading his way along the direct congested route (12·6 miles) through the heart of London.

Publications Received

Wiper Blades and Arms.—Trico-Folberth Limited, Great West Road, Brentford, London, has issued a folding service chart of Trico windscreen wiper blades and arms, showing the types required, and their dimensions, when replacement of the original equipment is necessary, on the principal British and American cars and lorries. All arms are spring-loaded, and obtainable in black or chromium finish. A range of universal wiper blades and arms, for application to vehicles of any make, is also shown. All types are available in 10-in. or 12-in. lengths, as well as in the lengths fitted as standard to the different vehicles concerned.

Trolleybus Chassis and Equipment.—The A.E.C. trolleybus chassis with English Electric equipment forms a combination widely used by operators at home and overseas, and its technical details are shown in two catalogues which we have received from the companies concerned in its construction. The Associated Equipment Co. Ltd., Southall, Middlesex, illustrates the range of A.E.C. trolleybus chassis in a 24-page publication giving the specifications of three double-deck and two single-deck types, one of the latter specially designed for service abroad. These chassis are suitable for bodies having passenger capacities between 40 and 74. Two of the chassis are of the 3-axle type, having a rear bogie with fully-floating axle shafts of 100-ton steel, the hubs running on large roller-bearings. Three differentials are incorporated, ensuring even distribution of driving and regenostatic braking torque. Further details of the electrical equipment fitted to all chassis types are provided in a folder published jointly with the A.E.C., by the English Electric Co. Ltd., Queen's House, Kingsway, W.C.2, in which is given a large key plan of a typical chassis with the electrical gear in position. The controller is foot-operated, interlocked with a hand reverser in the same casing. Driving motor and low-voltage generator are incorporated in one unit. Braking is by the English Electric special S.D. system, designed to provide an electric brake which does not entail a complicated control system, or return a heavy regenerative current to the overhead line.

XUM

Conversion to a Highway of the Florida Keys Railway

A length of 33 miles of railway bridges and formation are being replaced by a roadway to connect Key West with the mainland

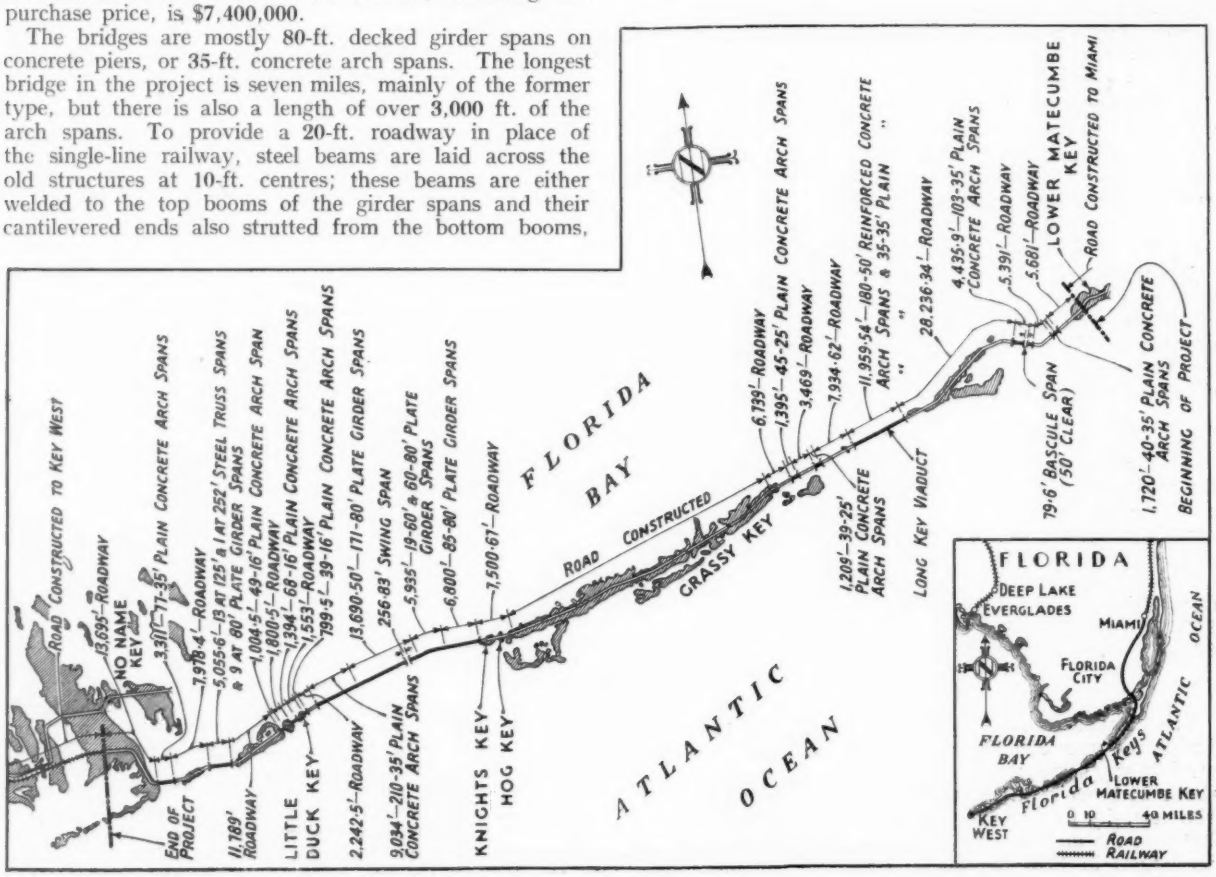
IN our issue of September 24 we published a description of the works entailed in the adaptation of the formation of the incompleted South Pennsylvania Railroad to the requirements of a new high-speed roadway. Now, thanks to our American contemporary *Engineering News Record*, we are able to give some details of another great work in the United States at present being carried out, with a similar end in view but in very different conditions. This is the conversion of the former Florida East Coast Railway into a modern paved highway, largely across bridges over the sea.

That railway was completed in 1912 at a cost of $26,000,000, but traffic never justified this great outlay, and when the Florida hurricane of 1935 killed over 500 people and very seriously damaged the railway, it was decided to abandon the latter. The bridges, formation, and right-of-way were subsequently sold to the Overseas Road & Toll Bridge District for $600,000, for the new highway; it is estimated that had new ones been constructed they would have cost $7,000,000. Altogether, the estimated total cost of the scheme, including this purchase price, is $7,400,000.

The bridges are mostly 80-ft. decked girder spans on concrete piers, or 35-ft. concrete arch spans. The longest bridge in the project is seven miles, mainly of the former type, but there is also a length of over 3,000 ft. of the arch spans. To provide a 20-ft. roadway in place of the single-line railway, steel beams are laid across the old structures at 10-ft. centres; these beams are either welded to the top booms of the girder spans and their cantilevered ends also strutted from the bottom booms, or they are concreted into the arch spans. They are water-proofed against sea-water with three coats of asphalt paint separated by asphalt-saturated fabric.

The exception to this general description is the Bahia Honda bridge, which was much more difficult to convert, as it is composed mainly of one 252-ft., thirteen 182-ft., and thirteen 125-ft. steel truss through spans, allowing of only one-way road traffic if their original floors were used for the highway. It was therefore decided to raise the latter on to the top booms, a work that has been complicated by the fact that the girder trusses are of varying height, necessitating six vertical curves in the profile of the roadway. In order to provide ramped approaches to the truss span top-boom levels, the adjacent decked spans were progressively raised by the erection of steel towers on the piers; the maximum height of the roadway above the sea is 65 ft.

It is claimed that this bridge, when the whole of it is completed—probably by the end of 1938, will include the longest oversea bridge for motor traffic ever built.



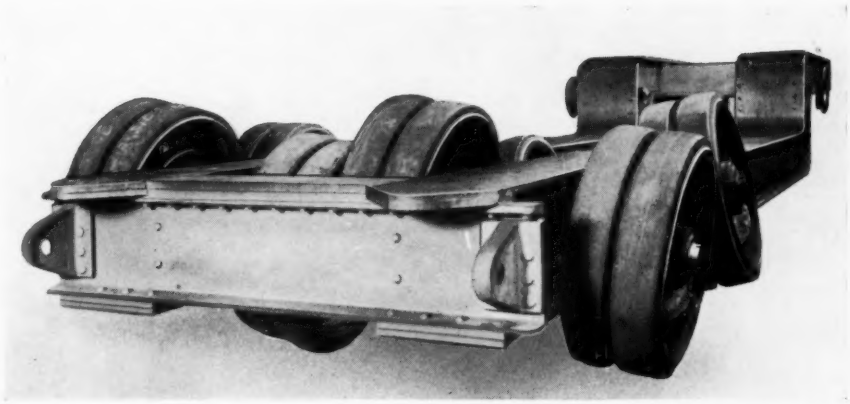
Plan showing the section of the former Florida East Coast Railway taken over for reconstruction as part of the Florida coast highway to Key West: inset, key map showing the position of the keys relative to the mainland

New 75-ton Low-Loading Trailer

Design with riveted frame affording exceptionally low loading-level for the capacity provided

THE carriage of locomotives and other concentrated loads by road is a difficult proposition, and calls for highly-specialised vehicles. Particular interest is attached, therefore, to a trailer of unusual and advanced design which has been built recently by R. A. Dyson & Co. Ltd., of Liverpool, for Road Engines & Kerr (Haulage) Limited, of Glasgow. It has a nominal capacity of 75 tons concentrated load, and is believed to be the lowest yet produced for the loads in question; it will actually accommodate the whole of the load concentrated within 5 ft. The frame, which is a riveted structure, is made from single plates and angles, giving the trailer a neat appearance. The tare of the trailer is approximately 23 tons. The overall length is 34 ft., overall width 9 ft., and the loading level in the well is 2 ft.

Above: General view of the 75-ton trailer, showing the sturdy frame assembly and the remarkably low loading-level



Right: All wheels are fully compensated for traversing uneven surfaces

The twelve wheels upon which the trailer is mounted are equipped with Dunlop twin 771 mm. × 180 mm. tyres of the reduced section type and Timken tapered roller bearings, each hub carrying a load of 8 tons on two bearings. All wheels are fully compensated, as can be seen from the photographs we reproduce, and the ability of the trailer to traverse uneven roads without distortion is worthy of special notice. In order to remove the rear wheels it is necessary to withdraw the axles from the chassis, and as this has to be done for tyre renewal, &c., it was considered undesirable to upset the adjustment of the bearings every time the wheels were removed. The axle and brakes are therefore cast together, the axle, of course, being of the tubular type, and provided with lugs to grip the square axle shoulder. Therefore, after the removal of the main retaining nut, the axle can be withdrawn, leaving the bearing setting intact, together with the brakes. This is believed to be the first time such an arrangement has been used, and it is claimed as an advance on anything hitherto produced.

A balance beam is fitted between the wheels at the rear. This is a steel casting, and is provided with special lugs to facilitate speedy removal. Brakes are fitted to all rear wheels, that is 8 brakes in all, and special attention has been given to prevent interference with the brakes when oscillating. For safety there are two entirely independent systems of braking, each controlled by a hand screw, and each operating on four sets of brakes. At the front, the four Timken-equipped wheels are mounted in line on two rocking axles. The latter are provided with a spindle which is in turn carried in a housing mounted on the carriage frame. These housings are split so that to remove the front wheels it is necessary only to take off the bearing cap, and the two wheels and through axle can be wheeled away.

Lugs are provided at the back so that another trailer can be attached, and lugs are also provided at the front to enable it to be hauled from either end. It will be observed that the chassis is specially designed so that by the provision of two runners it can be made flush for carrying loads such as engine beds and Lancashire boilers.

XUM

London Transport Staff Canteens

Modern methods of equipment and furnishing

MORE than once within recent months we have referred to the catering facilities provided by the London Passenger Transport Board for its road transport staffs, which are designed to secure for as many employees as possible the opportunity of obtaining wholesome meals and refreshments at reasonable prices. Considerable progress has been made during the past year or so in the provision of new canteens, and this is due partly to the reconstruction of a number of tram depots for trolleybus operation, in the course of which the canteen premises, that in many instances were cramped and out of date, have been replaced by new construction. At the end of 1937, the Welfare Department operated 92 canteens, employing 640 staff.

The new canteen at Stonebridge Park. On the left can be seen the gas stove, instantaneous boiler, crockery cupboard, and tea leaf bucket, provided for the engineering staff who wish to prepare their own food

In addition to the canteens, there are messrooms at all garages, stations, depots, and works, in which members of the staff can make tea and cook, or heat up, food which they bring with them. The policy of combining messrooms with canteens has been introduced at 13 Central Bus garages within the last two years. The chief advantage gained has been the saving in space by the use of one room for both messroom and canteen purposes, while it is possible also to maintain a higher standard of cleanliness in a fully-staffed canteen. At the many clubrooms or recreation rooms attached to canteens, billiards and other games equipment is provided. The playing of billiards, and other games, in a room where meals are being taken is not altogether a satisfactory arrangement, and, where space permits, provision is being made for a recreation room adjoining the canteen.

London Transport provides canteen premises free of charge, and bears the cost of installing the equipment, with due allowance for its replacement. In addition, the board bears the cost of administration expenses, maintenance of premises, and sundry other items on lines laid down for the remainder of the organisation. It is the policy to adjust canteen prices so that receipts just meet running expenses. Having regard to the high quality of food supplied, the prices charged are, of course, very reasonable.

The new clubroom at Hanwell trolleybus depot

Some interesting particulars regarding the London Transport staff canteens were published recently in *Pennyfare* and, by courtesy of its Editor, we reproduce from that article various features regarding the planning and operation of staff canteens which should

prove of general interest to those concerned with the difficult problem of insuring that adequate catering facilities are available for road transport staffs. In the design of new canteens special attention has been given to the following points:—

Tidiness and Simplicity of Design.—Kitchen equipment is hidden by a screen glazed with obscure glass, except for one pane through which it is possible for the staff anywhere in the kitchen to see the counter. Simplicity of outline has been preserved, and the bronze counter fittings harmonise well with the standard colour scheme of buff and pale green which has been applied to the dining-room portion of the canteens.

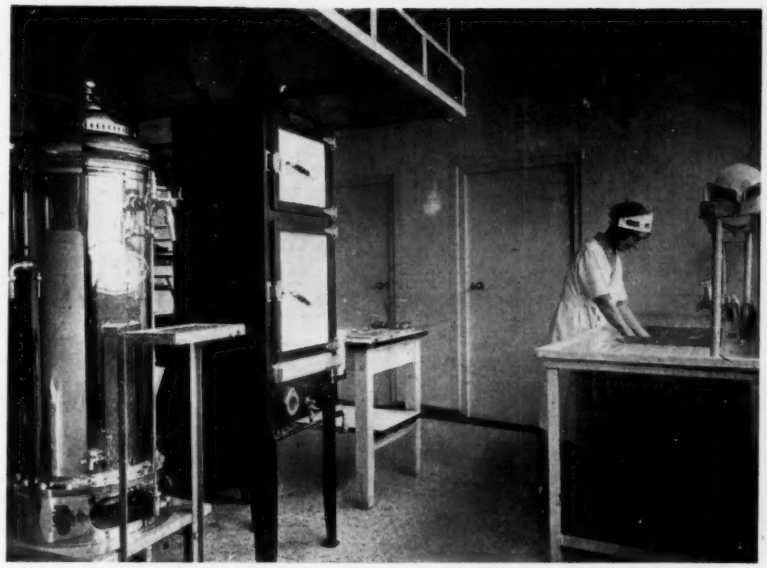
Display.—Cakes and cold dishes are displayed under the plate glass counter top, so that they are not exposed to dust. Goods packed in tins, bottles, or packets are displayed on shelves on the glass screen facing the counter.

Cleanliness.—The following measures have been adopted to encourage the highest possible standard of cleanliness in the kitchen: Floors and walls are tiled, and all corners " coved " to avoid dust; wherever possible the heavy equipment is placed in the middle of the kitchen, raised above the floor; exposed pipes are kept well clear of the walls; ample cleaning space is allowed behind any equipment which is fixed along the walls. Metal sinks are now in general use.

Improved Equipment.—Formerly, the day's menu was written in chalk upon a slate, and often presented an untidy appearance. New menu boards, framed in stainless steel, have now been provided on which the names of the dishes appear on removable ivorine slips. All cakes and pastries are freshly made on the premises, and, in order to accommodate cooling trays conveniently, wall racks have been provided which fold up when not in use. Enamelled iron teapots have been replaced by earthenware which improves the quality of the tea. Stainless steel hot-plates have been installed at the side of each counter so that the teapot is always within reach of the attendant at the counter. Cream-coloured crockery of improved design is now on trial, and will shortly be in general use in place of the thick crockery which has been accepted in past years to avoid a heavy breakage bill.

The food supplied at the canteens is of high quality, and every endeavour is made to ensure a high standard of cooking. Four instructor cooks are employed to train new staff and maintain a high standard with staff already trained. An adequate variety of food is available for the choice of the stewards, and an attractive selection is usually offered to meet varying tastes. A qualified analytical chemist is maintained at the board's expense to test supplies. There is cold storage equipment at the Central Stores, and refrigerators are installed at all canteens. Meat and vegetables are brought daily from Smithfield and Covent Garden markets, and are delivered the same day to the canteens. Other goods are delivered from the Central Stores four times a week, or in some cases, daily. Fresh milk (pasteurised) is delivered daily to the canteens. The cooks work to standard recipes and portions. There are 67 varieties of meat dishes, 24 various forms of vegetables, and 32 sweets from which the steward or stewardess is free to select the daily menu. Thus there should be ample variety for the man who feels it necessary to have a good square meal when at work. On the other hand, anyone with a delicate digestion can choose such items as soup, roll and butter; fish, or egg dishes; milk puddings, custard; fresh or stewed fruit; fresh salads and cheese; and fresh milk or malted milk. Since 1934 there has been a slow but steady increase in the preference for light foods in hot weather. It is estimated that in December, 1937, the canteens were serving over 40,000 staff daily. During recent years the use of the canteens per head of staff has steadily increased.

All aspects of the preparation and sale of food to the staffs of the London Passenger Transport Board are the responsibility of the department of the Chief Welfare Officer, Mr. A. W. C. Richardson. Since July, 1936, canteens have been provided at 23 additional places, and wherever reasonable need exists, full consideration is given to the possibility of establishing a canteen.



The new kitchen at Stonebridge Park. There are no dark or inaccessible corners, and all equipment is clear of the walls

Leyland Prosperity Bonus

A " prosperity " bonus of one week's wage for the 6,000 employees of Leyland Motors Limited was paid on December 23; it included all employees paid on a weekly or hourly basis. The past year has been a prosperous one for the employees, for two bonuses have previously been paid. In addition, the company's yearly wage bill for the past financial year shows an increase of 18 per cent. over that of 1936.

Jubilee of the Pneumatic Tyre

In a New Year message Sir George Beharrell, Chairman of the Dunlop Rubber Co. Ltd. and of Imperial Airways, says:—" The year now before us is of special interest to me because it marks the fiftieth anniversary of the invention of the pneumatic tyre. John Boyd Dunlop's invention of the cycle tyre in 1888 made motoring possible and one of the largest industries in the world is the result. We owe to the internal-combustion engine the development of flying, with its enormous possibilities for good and for evil. Distances are being eliminated, communications made easier, more frequent and speedier, which are bound to result in a better understanding throughout the world leading, we hope, to peace and prosperity."

XUM

Road Services in Brazil

Rail co-ordinated lorry services to safeguard railway interests

ACCORDING to the Superintendent's report of the Paraná-Santa Catharina Railway for the year 1935, details of which were published in the January 22, 1937, issue of THE RAILWAY GAZETTE, road competition, brought about as elsewhere in the country by rate-cutting and evasion of statutory tax payments, increased during the year in the area served by the above system. The most vulnerable zones were between São Paulo and Curytiba; and Curytiba and Joinville; including the region served by the Gracioza road, which, splendidly constructed, offered an excellent surface for motor lorries. These latter, operating well inside the technical limits of efficiency, at a ton-kilometre cost equal to that of the railway, were able to compete advantageously, obliging the railway to adopt similar means of transport. Accordingly, on July 1, 1935, a scheme of transport co-ordination, with the previous agreement of the Sorocabana Railway (which forms another of the links in through rail transit between São Paulo and Rio Grande do Sul), was introduced experimentally in the aforementioned zones, and up to December, 1935, had given satisfactory results. São Paulo, of course, was entirely in the hands of the Sorocabana, but gross receipts resulting from door-to-door collection and delivery by the Paraná-Santa Catharina Railway motor vehicles in Curytiba and Joinville amounted to 394 contos by the end of the year. At the outset the service was contracted, but during December the railway acquired two 3-ton Studebaker and five 2-ton Chevrolet lorries, costing in all 150 contos.

Competition had also been severe between Curytiba and the ports of Paranaguá and Antonina (on the E.F. Paraná Section), and proposals were made to the Transport Minister to acquire additional lorries for door-to-door service and to introduce competitive rates for the rail transport; according to the Superintendent's report for the year 1936, referred to in the November 26 issue of THE RAILWAY GAZETTE, the extension of motor services to Paranaguá and Antonina became a *fait accompli*.

During 1936 gross and net receipts from road motor services were 1,075 and 554 contos respectively. The two photographs, which are reproduced herewith, show (*a*) three lorries engaged on a door-to-door service, loaded with merchandise, and (*b*) a fleet of lorries outside Curytiba railway station.

Above: Lorries setting out to deliver goods from a depot of the Paraná—Santa Catharina Railway

Below: Lorries outside Curytiba station, centre of an area where unregulated road transport had adversely affected railway goods carryings

A Road-Rail Locomotive in the U.S.A.

OUR American contemporary, the *Railway Age*, recently published some interesting details of a new type of road-rail vehicle. This is a locomotive unit, driven by a 125 h.p. petrol engine, and designed for railway shunting, and short-distance or branch-line operations, as well as being adaptable for road haulage. Four flanged rubber-cushioned steel pilot wheels are fitted, but the drive is exclusively through four pneumatic-tyred front and rear wheels. The pilot wheels are retractable, by means of an electric jack, when it is desired to use the vehicle on the highway. The new unit has four-wheel air-actuated hydraulic brakes; five speeds forward or reverse, with equal speeds in either direction; an all-steel body; 30-in. sliding doors on each side; safety glass throughout; the Evans Product Company's heating and ventilation system; grab handles and steps; footboards at each end; and railing and rear-view mirrors. The driving compartment is large enough to hold seven men in addition to the driver. The vehicle is of streamlined design and sturdy construction, and in appearance is somewhat like one of the latest American streamlined coupé motorcars. It is equipped with front and rear headlights, and railway classification lamps, with a choice of green, red, or clear lights for front, rear, or side illumination from each lamp.

XUM

The Farnham-Haslemere Bus Service

A pioneer L.S.W.R. road service, now in the hands of a Southern Railway associate

IN the article on the silver jubilee of the Aldershot & District Traction Co. Ltd., published in our issue of October 22 last, brief mention was made of the pioneer motorbus service between Farnham and Haslemere which was maintained for some years by the old London & South Western Railway. Following the appearance of that article Mr. J. C. Chambers, Road Transport Liaison Officer, Southern Railway, kindly forwarded us further particulars of the service, and also an illustration of the bus, which we reproduce alongside. To fill a difficult gap between two of its main lines, a contract was made by the railway with John I. Thornycroft & Co. Ltd. to maintain a motor service for one year on the Farnham—Haslemere route. Under the agreement the railway company took the receipts and guaranteed 10d. a vehicle mile to the contractor. Following experimental runs in November, 1904, the service was begun in February, 1905, with one *back* entrance single-deck Thornycroft petrol bus. This vehicle had paraffin side and tail lights, but no interior lighting, and, as may be seen from the illustration, it had solid tyres and chain transmission. At the end of twelve months receipts exceeded the guaranteed 10d. a mile by about £115. The L.S.W.R. thereupon bought the bus and continued to maintain the service until 1913, when it was handed over to the Aldershot & District Traction Co. Ltd. The timetables reproduced below give a good idea of the average speeds and fares on this 12-mile provincial route a quarter of a century ago.

Early Thornycroft bus of the L.S.W.R.

LONDON AND SOUTH WESTERN RAILWAY.

ROAD MOTOR SERVICE

BETWEEN

FARNHAM & HASLEMERE

(Via FRENSHAM POND, CHURT POST OFFICE, BEACON HOTEL & HINDHEAD),

In connection with Trains from and to

LONDON AND OTHER PLACES.

ON MONDAY, 3rd JUNE, 1912.

And EVERY WEEK-DAY thereafter until further notice.

THE SERVICE WILL BE AS UNDER:

TIMES OF DEPARTURE FROM FARNHAM (BUSH HOTEL).							TIMES OF DEPARTURE FROM HASLEMERE STATION.						
		a.m.	a.m.	p.m.					a.m.	p.m.	p.m.		
FARNHAM (Bush Hotel)	depart	8 3	10 50	2 26			HASLEMERE STATION	depart	10 20	12 55	4 38		
FARNHAM STATION		8 33	10 53	2 41			NUTCOMBE LANE		10 29	1 4	4 47		
BOURNE (Post Office)		8 43	11 3	2 51			HINDHEAD (Huts Hotel)		10 43	1 18	4 51		
MILLBRIDGE, Frensham		8 7	11 13	3 1			HINDHEAD GOLF CLUB		10 53	1 28	5 1		
FRENSHAM (Schools)		8 17	11 23	3 11			CHURT (Post Office)		11 3	1 38	5 11		
FRENSHAM (Pond)		8 21	11 27	3 15			FRENSHAM (Pond)		11 11	1 46	5 19		
CHURT (Post Office)		8 41	11 47	3 35			FRENSHAM (Schools)		11 16	1 51	5 24		
HINDHEAD GOLF CLUB		9 2	12 11	3 50			MILLBRIDGE, Frensham		11 22	1 57	5 30		
		a.m.	p.m.	p.m.			BOURNE (Post Office)		11 35	2 10	5 43		
HINDHEAD (Huts Hotel)		9 4	12 13	4 0			FARNHAM STATION	arrive	11 44	2 19	5 52		
NUTCOMBE LANE		9 5	12 14	4 1			FARNHAM (Bush Hotel)		11 47	2 22	5 55		
HASLEMERE STATION	arrive	10 0	12 20	4 6									

SINGLE JOURNEY FARES FOR PASSENGERS.

FROM	FARNHAM BUSH HOTEL	FARNHAM STATION	BOURNE Post Office	MILLBRIDGE, FRENSHAM OR FRENSHAM SCHOOLS.	FRENSHAM POND	CHURT, Post Office	HINDHEAD GOLF CLUB	HINDHEAD BEACON HOTEL or HUTS HOTEL.	HUTCOMBE LANE.	HASLEMERE STATION.
FARNHAM (Bush Hotel)	—	3d.	3d.	6d.	9d.	1/-	1/3	1/6	1/9	2/-
FARNHAM (Station)	3d.	—	3d.	6d.	9d.	1/-	1/3	1/6	1/9	2/-
BOURNE (Post Office)	3d.	3d.	—	3d.	6d.	9d.	1/-	1/3	1/6	1/9
MILLBRIDGE, Frensham OR FRENSHAM SCHOOLS.	6d.	6d.	3d.	—	3d.	6d.	9d.	1/-	1/3	1/6
FRENSHAM (Pond)	9d.	9d.	6d.	3d.	—	3d.	6d.	9d.	1/-	1/3
CHURT (Post Office)	1/-	1/-	9d.	6d.	3d.	—	3d.	6d.	9d.	1/-
HINDHEAD GOLF CLUB	1/3	1/3	1/-	9d.	6d.	3d.	—	3d.	6d.	9d.
HINDHEAD (BEACON HOTEL or HUTS HOTEL)	1/6	1/6	1/3	1/-	9d.	6d.	3d.	—	3d.	6d.
NUTCOMBE LANE	1/9	1/9	1/6	1/3	1/-	9d.	6d	3d.	—	3d.
HASLEMERE STATION	2/-	2/-	1/9	1/6	1/3	1/-	9d.	6d.	3d.	—

CHARGES FOR LUGGAGE ACCOMPANYING PASSENGERS:
Small Articles 2d. per package; Large or Bulky Articles 4d. per package.

DOGS.—Dogs are not conveyed.

BICYCLES, MAIL CARTS and PERAMBULATORS. A charge of 6d. each will be made for Bicycles, Mail Carts and Perambulators and they will only be carried if accommodation permits and entirely at the Owner's Risk.

STOPPING PLACES.—The Vehicle will stop if required at any point on the journey other than the booked places. Passengers joining the Vehicle at any intermediate point must pay the fare from the previous booked stopping place.

TICKETS.—Tickets will be issued by the Conductor, and must be held till the end of the journey.

RECEIPTS.—Passengers should be careful to obtain printed Receipts for all amounts paid for Luggage, &c., and all traffic is conveyed subject to the conditions appearing on the Company's receipts.

N.B.—The Time Table shows the time at which the Vehicle may be expected to start and arrive, but the Company do not undertake that the Vehicle will start or arrive at such times, and the Company reserve the right to alter or suspend the running of the Vehicle without notice. Connection with the Trains is not guaranteed, and the Company will not be responsible for any loss, inconvenience, or injury to Passengers or their property, resultant from delays or detention however caused.

H. A. WALKER, General Manager

7.22 [illegible]

[illegible] & Sons Ltd., Printers, York, and London.

Aldershot and District Traction Co., Ltd.,

MOTOR OMNIBUS SERVICE

BETWEEN

FARNHAM & HASLEMERE

(Via Frensham Pond, Churt Post Office, Beacon Hotel & Hindhead),

In connection with Trains from and to

LONDON From the FARNHAM & HASLEMERE STATIONS, L.S.W.R.;

And also in connection with the Aldershot and District Traction Company's Omnibus Service between ALDERSHOT, FARNBOROUGH and FLEET STATIONS on the L.S.W.R., and to other places in the District.

On THURSDAY, 12th JUNE, 1913,

And EVERY WEEK-DAY thereafter until further notice.

THE SERVICE WILL BE AS UNDER:

TIMES OF DEPARTURE FROM FARNHAM (Bush Hotel).							TIMES OF DEPARTURE FROM HASLEMERE STATION.						
		a.m.	a.m.	p.m.	p.m.				a.m.	p.m.	p.m.	p.m.	
Farnham (Bush Hotel)	depart	8 30	10 50	2 30	4 38		Haslemere Station	depart	10 20	12 55	4 38	6 18	
Farnham Station		8 33	10 53	2 33	4 41		Nutcombe Lane		10 29	1 4	4 47	6 27	
Bourne (Post Office)		8 43	11 3	2 43	4 51		Hindhead (Huts Hotel)		10 43	1 18	4 51	6 39	
Millbridge, Frensham		8 53	11 13	2 53	5 1		Hindhead Golf Club		10 53	1 28	5 1	6 49	
Frensham (Schools)		8 57	11 17	2 57	5 5		Churt (Post Office)		11 3	1 38	5 11	6 59	
Frensham (Pond)		9 4	11 24	3 4	5 12		Frensham (Pond)		11 11	1 46	5 19	7 7	
Churt (Post Office)		9 9	11 29	3 9	5 17		Frensham (Schools)		11 16	1 51	5 24	7 12	
Hindhead Golf Club		9 27	11 47	3 27	5 35		Millbridge, Frensham		11 22	1 57	5 30	7 18	
		a.m.	a.m.	p.m.	p.m.		Farnham Station		11 30	2 5	5 38	7 26	
Hindhead (Huts Hotel)		9 41	12 13	3 43	5 51		Farnham (Bush Hotel)	arrive	11 47	2 22	5 55	7 39	
Nutcombe Lane		9 51	12 13	3 53	5 59								
Haslemere Station	arrive	10 0	12 20	4 6	6 18								

SINGLE JOURNEY FARES FOR PASSENGERS

FROM	Farnham Bush Hotel	Farnham Station	Bourne Post Office	Millbridge, Frensham or Frensham Schools	Frensham Pond	Churt Post Office	Hindhead Golf Club	Hindhead Beacon Hotel or Huts Hotel	Nutcombe Lane	Haslemere Station
FARNHAM (Bush Hotel)	—	3d.	6d.	9d.	1/-	1/3	1/6	1/9	2/-	
FARNHAM (Station)	3d.	—	3d.	6d.	9d.	1/-	1/3	1/6	1/9	2/-
BOURNE (Post Office)	3d.	3d.	—	3d.	6d.	9d.	1/-	1/3	1/6	1/9
MILLBRIDGE Frensham OR FRENSHAM SCHOOLS	6d.	6d.	3d.	—	3d.	6d.	9d.	1/-	1/3	1/6
FRENSHAM Pond	9d.	9d.	6d.	3d.	—	3d.	6d.	9d.	1/-	1/3
CHURT Post Office	1/-	1/-	9d.	6d.	3d.	—	3d.	6d.	9d.	1/-
HINDHEAD GOLF CLUB	1/3	1/3	1/-	9d.	6d.	3d.	—	3d.	6d.	9d.
HINDHEAD Beacon Hotel or Huts Hotel	1/6	1/6	1/3	1/-	9d.	6d.	3d.	—	3d.	6d.
NUTCOMBE LANE	1/9	1/9	1/6	1/3	1/-	9d.	6d.	3d.	—	3d.
HASLEMERE STATION	2/-	2/-	1/9	1/6	1/3	1/-	9d.	6d.	3d.	—

CHARGES FOR LUGGAGE ACCOMPANYING PASSENGERS:
Small Articles 2d. per package; Large or Bulky Articles 4d. per package.

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T. M. FOSTER, Managing

[illegible] Dyer, Printer & Stationer, Church Street, Aldershot.

Left: Handbill of the Farnham—Haslemere motorbus service under L.S.W.R. auspices in 1912. *Right: The* 1913 *bill (slightly damaged) issued by the Aldershot & District Traction Co. Ltd.*

XUM

A Practical Hose Ramp

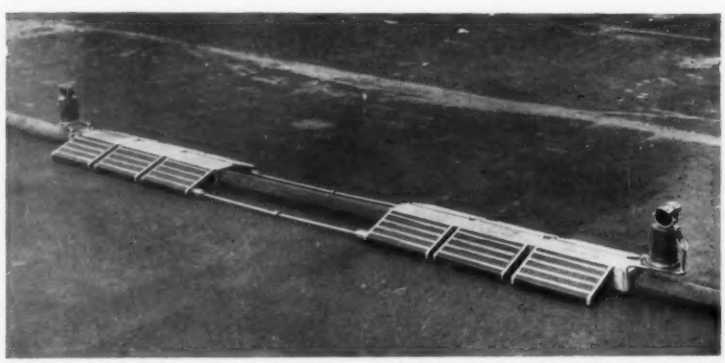
A lightweight device to avoid obstruction from temporary hose-pipes

THE restriction on the free movement of motor vehicles caused by the temporary positioning of hosepipes—whether for fire-fighting or garage-washing purposes—is often so hampering, and in the former case even dangerous, that an appliance which will readily and easily overcome such a source of delay is a welcome addition to garage equipment and fire-fighting installation alike. A specially-designed hose-ramp manufactured by the South Wales Fire Protection Engineers Limited, of Bute Docks, Cardiff, meets this difficulty in a satisfactory manner. It is known as the Bain-Bridge hose-ramp, and as part of the equipment of a fire engine not only permits vehicles to move freely in the neighbourhood of an outbreak but also enables fire engines to manœuvre without delaying operations, and without damage to equipment. The ramp is also of great value to dock companies, garages, building contractors, and railway companies, for the protection of hoses, ropes, cables, chains, and other temporary obstructions, or where it is not possible to build up a permanent form of protection.

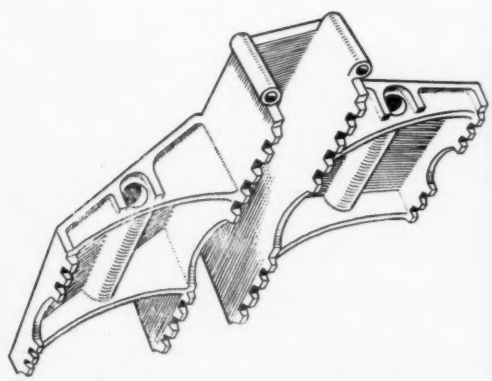
Model No. 1 ramp comprising eight contiguously-placed sections affording complete protection, and providing a traffic path for vehicles of every kind

The ramp, a section of which is illustrated below, is easy to handle, the metal used in its construction being an aluminium alloy of exceptional toughness and lightness which does not corrode or rust. It is placed in position in a matter of seconds, and will not slip; is easily seen on the roadway; and, in addition, is fitted with detachable red enamelled caution signals for the day use, and electric red lamps, for night use which clearly mark the extreme width of the ramp. The ramp is designed in sections to form a complete wheel track for widths up to 8 ft. 6 in., and is constructed in sizes convenient for stowing in the side pockets of fire engines. Any number of sections, from two upwards, may be used in series (eight sections are sufficient to accommodate all types of road vehicle). Every section of the ramp is tested to withstand a pressure of over eight tons, and thus affords ample safety margin according to the maximum weight allowed by the Road Traffic Act. A most important feature in the design of the ramp is articulation. This allows each section to adjust itself to the camber of the road and any uneven surface. A ribbed gradient of one in three affords safe and easy passage of traffic, and inspires confidence in the driver. The ramp can be supplied to suit any size hose to a limit of $3\frac{1}{2}$ in. diameter, thus providing double waterway for a $2\frac{1}{2}$-in. hose. It is supplied in two models as illustrated. In Model No. 2, the two series, each of three sections, are connected by tie-rods which act as distance pieces.

Electric flashing flares can be supplied in place of the standard night signals at a slight extra cost. The Bain-Bridge hose ramp was devised by a fire brigade officer as the outcome of practical experience over a long period of those difficulties which it overcomes. Among its several uses is the removal of a difficulty which in the past has doubtless reduced the efficiency of fire brigades in actual operation.



Model No 2, six sections. Note night caution and guide electric red lamps, which can be replaced by red enamelled signals for day use



Perspective view of a section of hose ramp. Every section is tested to withstand a pressure of over eight tons

Door-to-Door for Bulk Liquids

Equipment evolved by the L.N.E.R. in conjunction with Imperial Chemical Industries Limited

THE bulk carriage of liquids in railway tank wagons has hitherto been confined largely to cases in which both the producer's and the consumer's premises are served direct by railway sidings. The advantages to be derived from bulk transport are obvious—including the lower rates for large tonnages and simplification of both loading and unloading—and in order to extend them to premises that are not directly served by railway, the system of constructing units consisting of demountable tanks on a railway chassis is being developed. For ease of handling, two or more such tanks can be mounted on each rail chassis. The tanks can be of a size that makes them capable of being lifted without difficulty by crane to the road vehicles by which they are conveyed direct to factory and returned to rail when discharged or loading has been completed.

Two demountable chemical tanks on a special six-wheel railway chassis

An example of such a road-rail unit is shown in the illustration of equipment recently evolved by Imperial Chemical Industries Limited, in conjunction with officials of the L.N.E.R., for dealing with certain chemicals from the Billingham works of the I.C.I. to one of its customers whose premises are some distance from rail. The railway company was responsible for the construction of the wagon and tanks. The tanks shown have a carrying capacity of about 6½ tons and a gross laden weight of approximately 8 tons. Similar equipment is being constructed for carrying other chemicals, the properties of which determine the particular metal of which the tanks are constructed and the lining necessary. Provision can also be made, where necessary, for liquids to be kept at specified temperatures either by insulation or by steam or electric heating *en route*, so that they arrive at the discharge point in fluid form.

So that full advantage may be taken of the express freight train services (thus reducing the turn-round of the equipment and number of units required) the wagons used for the purpose are of the six-wheeled type and fitted with auxiliary springing and automatic vacuum brakes.

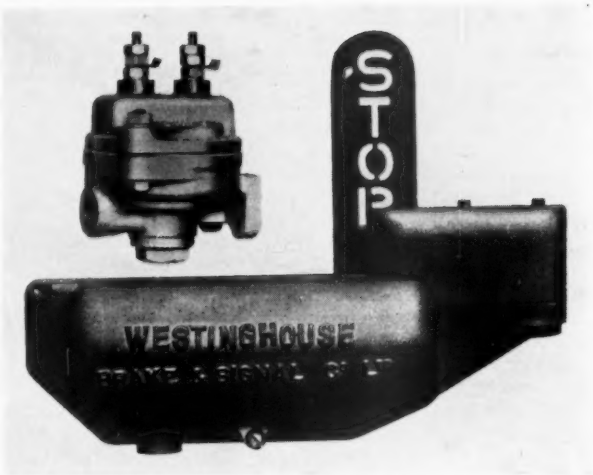
One of the most recent additions to the famous Royal Blue fleet of coaches. It is an A.E.C. diesel-engined Regal vehicle, of which many are to be found in Royal Blue livery. The Royal Blue routes cover the whole of the south and west of England; they were formerly the property of Elliott Bros. (Bournemouth) Ltd., but are now maintained jointly by the Western National Omnibus Co. Ltd., and the Southern National Omnibus Co. Ltd. The latter company is the owner of the vehicle we illustrate

A Low Vacuum Indicator

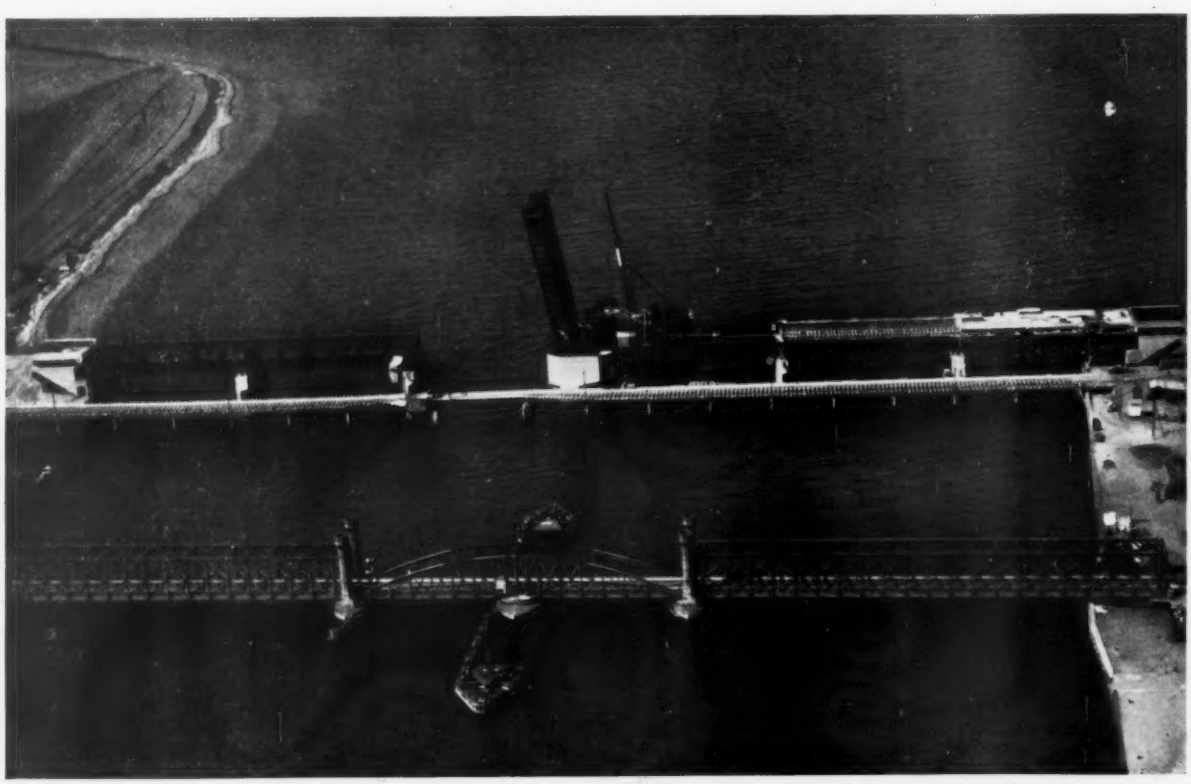
THE Motor Vehicles (Construction and Use) Regulations, 1937, regarding the use of warning signals, reads as follows:—

Every motor vehicle registered on or after October 1, 1937, and as from October 1, 1942, every motor vehicle which is fitted with a servo braking system which embodies a vacuum or pressure reservoir or reservoirs, shall be provided with a warning device so placed as to be readily visible to the driver of the vehicle when in the driving seat in order to indicate any impending failure or deficiency in the vacuum or pressure system.

The Westinghouse low pressure signal for air brakes, brought out in collaboration with London Transport engineers for use on their trolleybuses, is shown in the illustration. Inset is seen a new device recently introduced by Westinghouse to indicate low vacuum, for use with vacuum brakes, 376 of which have been ordered for London Transport oil-engined buses. This indicator contains a spring-loaded diaphragm, which is arranged to maintain an electric circuit to the dashboard lamp for so long as the vacuum in the reservoir remains at a predetermined value sufficient to operate the brakes satisfactorily. Immediately the vacuum falls, the spring causes the contacts to break the circuit to the lamp, the switching off of which immediately gives the required warning to the driver.



Westinghouse low-pressure air brake signal, and (inset) mechanism of new dashboard warning lamp indicator, to detect failure in vehicles with vacuum brakes



Aerial view showing the old railway bridge over the Masnedsund, and the new road and rail bridge under construction. This bridge forms a link in the connection between Zealand and Falster of which the Storstrøm bridge, described in "The Railway Gazette" of October 22, is the main feature. The old bridge had a swing span which opened to allow of navigation and had a wooden deck laid to the level of the rails to permit of the passage of road motor vehicles. The new bridge, with separate tracks for road and rail, has a bascule lifting span. It was fabricated by Sir William Arrol & Co. Ltd., and erected by Dorman Long & Co. Ltd., who also supplied the steelwork

THE L.M.S.R. AIR RAID PRECAUTION UNIT

A two-coach train equipped for training purposes, but of a type suitable for actual decontamination work in case of need

A MOBILE unit consisting of two specially-equipped coaches, one a lecture coach and the other a decontamination coach, has been built by the L.M.S.R. at Wolverton works, as briefly recorded in our issue of November 26 last. The unit is to be sent to outlying districts to enable lectures and practical demonstrations to be given to members of the staff who have been selected for training in air raid precautions work.

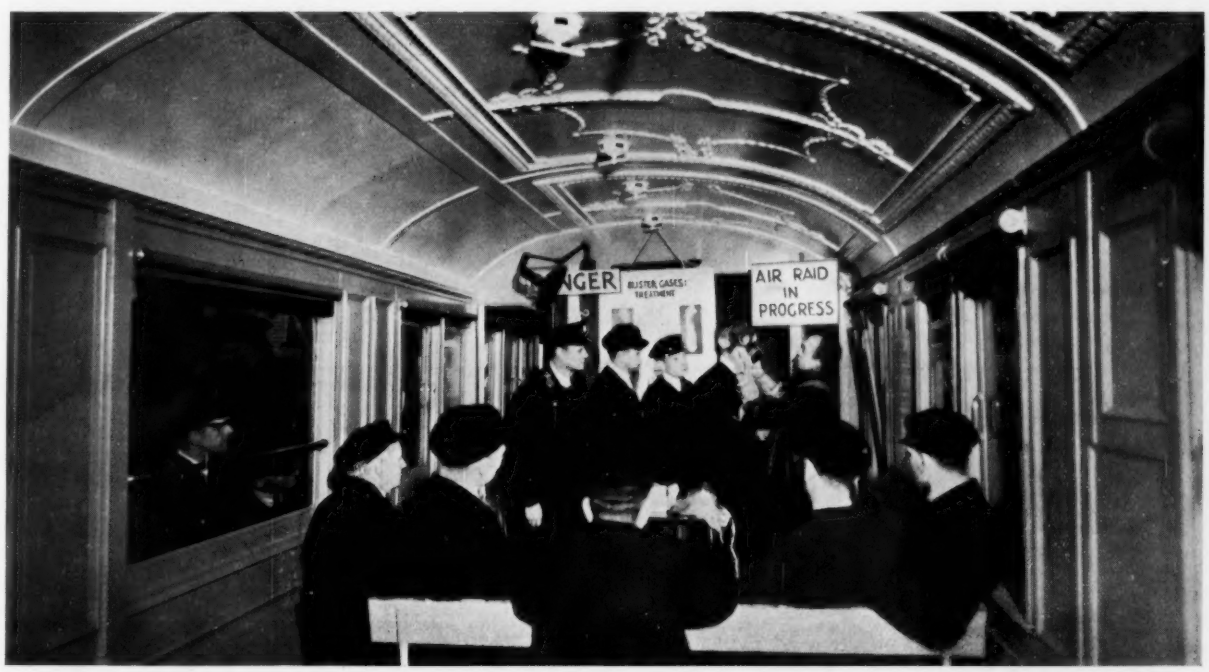
The lecture coach has accommodation for a class of 30, and is equipped for demonstration purposes with gas masks, protective clothing, &c. The decontamination coach, which is provided with air-locks, is fitted with a hot-water boiler and is divided into three compartments, an undressing room, bathroom with shower baths, and a dressing room, covering the three successive phases of cleansing any individual who has been exposed to the effects of poison gas.

In addition to the tour of the unit, lectures are being given at centres in large towns, and approximately 23,000 members of the L.M.S.R. staff will be trained in methods approved by the Home Office for dealing with the consequences of an air raid, including the effects of poison gas and incendiary bombs.

Although the unit illustrated is to a certain extent experimental, it is envisaged that, in the event of war, units of this type would be used in conjunction with breakdown trains. A unit could then be sent with the train to any point unprovided with facilities for decontamination work which might be damaged by aerial bombing.

Before beginning its extensive demonstration tour, this mobile instructional unit was shown at Euston station on Wednesday, November 24, last, when it was seen that the train is finished in a distinctive bright yellow livery.

The guard of the L.M.S.R. mobile air raid precautions unit, wearing the civilian type of gas mask



L.M.S.R. staff being fitted with gas masks during air raid precautions training in the mobile instructional unit

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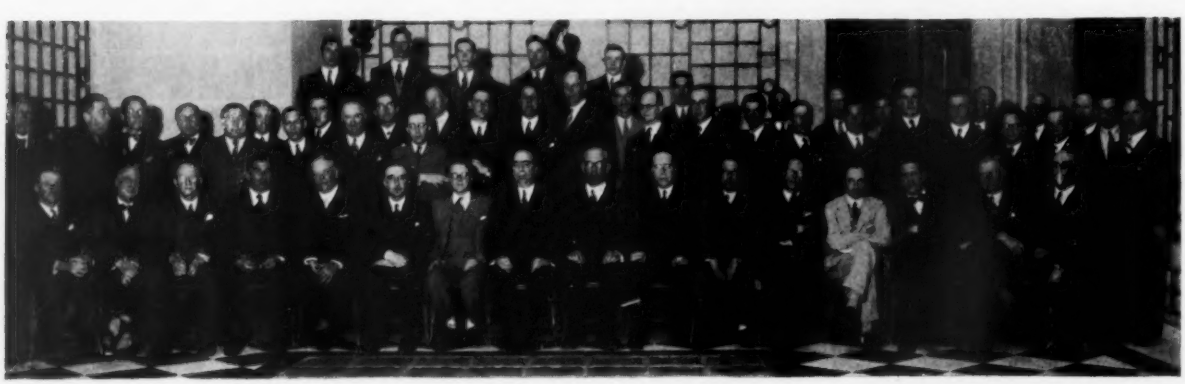
"CORONATION"
LOCOMOTIVE BUILT BY MR. TIMOTHY HACKWORTH IN HONOUR OF THE CORONATION OF KING WILLIAM IV-1831
CORONATION ENGINE FROM NEEDLEWORK PICTURE IN THE JOHN PHILLIMORE COLLECTION OF EARLY RAILWAY RELICS
FORERUNNER OF THE CORONATION 1937 L·N·E·R STREAMLINE TRAIN KINGS CROSS AND EDINBURGH
LONDON AND NORTH EASTERN RAILWAY

A century of progress portrayed in a pair of L.N.E.R. posters by Doris Zinkeisen, showing (left) Hackworth's engine of 1831 *named "Coronation" to commemorate the crowning of King William IV; and (below) the L.N.E.R. streamlined London-Edinburgh Coronation express, named in honour of the coronation of King George VI in* 1937. *Details of the Hackworth "Coronation" locomotive were taken by the artist from a needlework picture supposed to have been worked by the wife of the driver, and reproduced in our issue of January* 22, 1937. *It is now in the John Phillimore collection*

"THE CORONATION"
DESIGNED BY SIR NIGEL GRESLEY CHIEF MECHANICAL ENGINEER L·N·E·R IN HONOUR OF THE CORONATION OF KING GEORGE VI 1937
KING'S CROSS - EDINBURGH IN 6 HOURS
LONDON AND NORTH EASTERN RAILWAY

Below: Members of the Institution of Civil Engineers (Buenos Aires Association) photographed at the Union Club, Santiago, with the Director-General and principal officers of the Chilean State Railways during the visit of the institution to Chile *(see Overseas paragraph on page* 63*)*



RAILWAY NEWS SECTION

PERSONAL

The King of the Belgians has conferred upon Mr. Charles Cooper, Continental Assistant to the Traffic Manager, Southern Railway, the honour of Chevalier de l'Ordre de Leopold. The insignia was presented to Mr. Cooper on Monday, January 10, at the Belgian Embassy in London by M. le Baron E. de Cartier de Marchienne, the Belgian Ambassador, on behalf of the King of the Belgians. The decoration is for services rendered in connection with the development of Anglo-Belgian traffic relations.

Sir Laurence Halsey was on January 7 appointed an Auditor of the L.N.E.R., in succession to the late Sir Albert Wyon, whose death on December 1 was recorded in our issue of December 10. Sir Laurence Halsey, who is 66, was the Honorary Accountant to the Prince of Wales National Relief Fund, and is Auditor to the Duchy of Cornwall. He was a member of the Royal Commission on Wheat Supplies which sat from 1918 to 1920.

Mr. James Pascoe Sandow, for many years Chief Clerk at the Great Northern Railway (Ireland) goods depot in Dublin, has retired on superannuation, after 51 years' service. He is succeeded by Mr. P. Gormley, of the District Superintendent's Office.

The Rt. Hon. Sir John Anderson has been appointed a Director of the Midland Bank Limited.

The Department of Overseas Trade announces that Sir Louis Beale, K.C.M.G., C.B.E., has been appointed Commissioner-General for the United Kingdom section of the New York World's Fair, 1939.

Mr. H. D. Brydone Jack has been appointed Assistant Manager, Department of Personnel, Canadian Pacific Railway.

Mr. Walter S. Thompson, who has been in charge of the publicity of Trans-Canada Air Lines (a subsidiary of the Canadian National Railways) since its formation in April, has been appointed Director of Publicity of the undertaking.

Mr. W. Gordon Bradley, B.A., whose appointment as Solicitor to the Great Southern Railways, Ireland, was recorded in our issue of December 17, is the son of the late Mr. William David Bradley, Solicitor, of Wellington Road, Dublin, and Greystones. Educated at St. Colomba's College and Trinity College, Dublin,

Photo] [Lafayette

Mr. W. Gordon Bradley, B.A.
Appointed Solicitor, Great Southern Railways, Ireland

Mr. Gordon Bradley was admitted Solicitor in May, 1906, and was awarded a special certificate for distinguished answering by the Court of Examiners of the Incorporated Law Society of Ireland, of which body he was in 1921 elected a Member, and still retains that position. Mr. Bradley was elected President of the Incorporated Law Society for the year 1932/3. On admission as a Solicitor, Mr. Bradley joined Messrs. W. G. Bradley & Sons, Solicitors, of Ormond Quay, Dublin, in which firm he is a partner. In 1928, he was appointed by the Great Southern Railways to undertake the legal work of the company in the Circuit and District Courts in the Dublin area, and has held that appointment since that date. Mr. Bradley has had considerable experience of railway work, as his firm acted as local agents for the former Dublin & South Eastern, and Great Southern & Western Railways, and the Great Northern Railway (Ireland).

Indian Railway Staff Changes

Mr. A. Richardson, Chief Mechanical Engineer, G.I.P.R., has been granted two years' leave preparatory to retirement, as from November 9 last.

Lt.-Col. R. E. Gordon, M.C., R.E., has been appointed to officiate as Deputy Chief Engineer, N.W.R., as from October 22.

Mr. G. E. Berkley has been appointed to officiate as Chief Traffic Manager, G.I.P.R., as from November 1, and Mr. K. J. McNeill has been appointed to succeed him as officiating Deputy Traffic Manager, General, as from the same date.

Mr. R. L. W. Meehan, on return from leave, resumed duty as officiating Chief Mechanical Engineer, E.B.R., on November 8. Mr. C. A. K. Bradley, who was officiating for him, reverted to his substantive post of Deputy C.M.E., on that date.

Mr. A. Richardson, V.D., M.I.Loco.E., M.Inst.T., Chief Mechanical Engineer, Great Indian Peninsula Railway, who, as announced above, has been granted two years' leave preparatory to retirement, as from November 9 last, joined that railway as Chief Carriage Inspector in 1906. He was appointed Assistant Carriage and Wagon Superintendent in the following year, and was promoted to be District Carriage and Wagon Superintendent in 1914. Seven years later he was promoted to be Deputy Carriage and Wagon Superintendent, and in 1925 became Deputy Transportation Superintendent, Carriage and Wagon. After two years in this post Mr. Richardson was appointed Deputy Chief Mechanical Engineer, C. & W., and it was in 1933 that promotion to Chief Mechanical Engineer followed. He was recently elected as Chairman of the Central Standards C. & W. Committee.

We regret to record the death, on December 31, at the age of 36, of Mr. Charles H. Keen, Assistant Managing Director of Guest Keen Baldwins Iron & Steel Co. Ltd., and a Director of Guest, Keen & Nettlefolds Limited. Mr. Keen had been connected with the

Mr. G. Hally

Who has retired from the position of Operating Manager (Railways), L.P.T.B.

Mr. Evan Evans

Appointed Operating Manager (Railways), London Passenger Transport Board

Mr. H. Raine

Appointed Permanent Way Engineer (Trams), London Passenger Transport Board

iron and steel industry since leaving Cambridge.

Mr. George Hally, who as announced in our issue of January 7, has retired from the position of Operating Manager (Railways), L.P.T.B., was born in Glasgow in 1885 and educated at Uddingston Grammar School and the Royal Technical College, Glasgow. After serving six years' apprenticeship with Alley & MacLellan Limited, of Glasgow, he obtained further experience with J. Taylor & Sons, Civil Engineers, Westminster, occupying for three years the position of Mechanical Draughtsman and for four years that of Resident Engineer. He then became successively Chief Engineer to the Sun Power Co. Ltd., of London and Cairo; Assistant to the Works Manager to W. H. Dorman & Co. Ltd., of Stafford; Engineering Manager to the Gloucestershire Aircraft Company of Cheltenham; and held other positions as Works Manager to important engineering firms. In 1923 Mr. Hally was appointed Chief Mechanical Engineer to the Metropolitan Railway, and in 1931 became, in addition, that company's Traffic Manager. While C.M.E. of the Metropolitan he designed five 7-coach trains with roller-bearing axleboxes, and altogether placed in service 65 vehicles so equipped. The widened lines from Wembley Park to Harrow, and the Stanmore branch, with the first C.T.C. signalling installation in this country, were opened during his period as Traffic Manager. Mr. Hally was appointed Operating Manager (Railways), London Transport, in 1933.

Mr. Evan Evans, who, as announced in our issue of January 7, has been appointed Operating Manager (Railways), London Passenger Transport Board, started his career as an indentured traffic apprentice in the General Manager's Office, Belfast & Northern Counties Railway. In 1906 he came to the office of Sir George Gibb, then Managing Director of the Underground Electric Railways Company, and was appointed Chief Clerk to the Superintendent of the Line,

Howard] *[Coster*

Mr. F. K. Rogers

Appointed District Goods, Passenger and Docks Manager, Barrow, L.M.S.R.

Mr. H. D. Case

Appointed Assistant to Superintendent (Horse), Paddington, Great Western Railway

Mr. A. S. C. Chattey

Appointed General Sales Manager, Associated Equipment Co. Ltd.

Underground group, in 1910. He was subsequently appointed Assistant Superintendent of the Line. From 1925-28 his services were loaned to the Postmaster-General, as Manager of the Post Office tube. Resuming his former position on the Underground, he was selected with two engineering colleagues to proceed to Russia to advise the Soviet in connection with the Moscow Underground scheme. When the L.P.T.B. came into being Mr. Evan Evans became Indoor Superintendent (Railways). He was appointed General Superintendent (Railways) in 1934.

Mr. H. Raine, whose appointment as Permanent Way Engineer (Trams) was recorded in THE RAILWAY GAZETTE of January 7, gained his early experience with several large steel manufacturing firms in Sheffield, spending nine years with Hadfields Limited, in the special trackwork department. In 1920 he left Hadfields to take up a position as Technical Assistant in the Tramways Permanent Way Department of the London County Council. Since the formation of the London Passenger Transport Board he has been Principal Assistant to the Permanent Way Engineer (Trams), to which position, vacated by the appointment of Mr. Croom Johnson as Technical Officer in the Chief Stores Superintendent's Department, he has now been appointed.

Mr. F. K. Rogers, whose appointment as District Goods, Passenger and Docks Manager, Barrow, L.M.S.R., was recorded in our issue of January 7, entered the service of the former London & North Western Railway at Lime Street, Liverpool, in 1894, as a probationer, and, after gaining experience at various district offices and stations in the Traffic and Goods Departments, was made Outdoor Assistant to the Superintendent of the Line, being stationed successively at Birmingham, Preston, and Crewe. In 1907 he was made Assistant District Superintendent, Liverpool, and in 1917 succeeded to the position of District Traffic Superintendent of the former Lancaster and Carlisle and West Cumberland District; and became District Goods Manager in 1925 at Barrow following upon the amalgamation of the railways, taking over the passenger commercial work in 1931; the position has now been redesignated to include that of Docks Manager. The district under Mr. Rogers's supervision covers Heysham harbour and the Midland Section as far as Clapham Junction; also Barrow docks and the old Furness; Cleator & Workington; Cockermouth, Keswick & Penrith; and Maryport & Carlisle, Railways and West Cumberland Joint lines; and the old Lancaster & Carlisle, and West Cumberland areas of the former L.N.W.R., excluding Carlisle itself, which was attached to the Scottish division in the early days of the amalgamation.

Mr. H. D. Case, who, as recorded in our issue of December 31 has been appointed Assistant to Superintendent (Horse), Road Transport Department, Paddington, G.W.R., entered the service of the Great Western Railway in December, 1913. During the war he served in France and Germany with the Honourable Artillery Company. Returning to the company's service in the Horse Superintendent's Office and Road Transport Department, he was appointed Clerk-in-Charge, Bristol and District, Road Transport (Horse) Department, in 1929. In 1931 Mr. Case was appointed Assistant Horse Superintendent, with office at Birmingham, whence he has now come to London.

Mr. A. S. C. Chattey, Home Sales Manager of the Associated Equipment Co. Ltd., has been appointed General Sales Manager of the company in succession to the late Mr. Norman A. Hardie.

Mr. S. Hollands, Service Manager of the company since 1929, succeeds Mr. Chattey as Home Sales Manager.

Mr. H. Dymond, Chief Inspector in the Maintenance Department since 1927, has been appointed Service Manager in succession to Mr. Hollands.

Mr. A. S. C. Chattey joined the former London General Omnibus Co. Ltd. as an apprentice in 1909, and prior to the war served in several of the suburban garages. From 1914-1919 he was with the Honourable Artillery Company, and was twice mentioned in despatches. In 1919 he resumed work in the A.E.C., first in the Experimental Department, and then as Chief Assistant in the Sales Department. He was promoted Sales Manager in January, 1925, and upon the amalgamation of the Daimler Company with the A.E.C. he became Home Sales Manager—a position he has since held continuously. By virtue of his past work, Mr. Chattey is already well known to a large number of municipal officials, sales executives, and important transport organisations up and down the country.

BRAZILIAN APPOINTMENTS

Dr. Octacilio Pereira, engineer, and one of the most prominent students of Brazilian railway problems, has been re-appointed General Manager of the Viação Ferrea do Rio Grande do Sul.

With the re-arrangement of the Cabinet, brought about by the new Constitution promulgated on November 10, Dr. Marques dos Reis has vacated the Ministry of Transport, to take over the duties of President of the Bank of Brazil. In his place, Dr. Getulio Vargas, President of the Republic, has appointed Colonel Mendonça Lima as General Manager of the Central Railway, and Snr. Delamare São Paulo, Traffic Manager of the Central Railway, to be Secretary to the Ministry of Transport.

Railways, generally, have benefited from the period of nearly three years during which both the retiring and new ministers have held their respective posts, and their terms of office have been marked by the electrification of the Rio de Janeiro suburban section of the Central Railway.

We regret to announce the death of Mr. P. J. O'Sullivan, who retired some years ago from the position of District Superintendent at Kingsbridge, Dublin.

Mr. N. Reay, late of the Yorkshire Traffic Office, Leeds, has been appointed Clerk to the Traffic Commissioners for the Eastern Area.

It is with regret that we record the death on December 21 of Sir Frederick Frankland, 10th Baronet of Thirkleby. Sir Frederick, who entered the army and served in the Matabele and South African wars, acted during the Great War as Assistant Provost-Marshall and Railway Transport Officer.

INSTITUTION OF CIVIL ENGINEERS

Among the associate members elected at a meeting of the institution on December 7 were: Messrs. S. M. Alam (Nizam's State Railway), C. W. Clarke (G.I.P. Railway), A. C. L. Fooks (New Zealand Government Railways), W. Grant (Nigerian Railway), L. S. Johnson (G.I.P. Railway), H. W. C. M. Murray and E. de C. Penso (Jamaica Government Railway), and G. W. D. Venables-Llewelyn (Sir Alexander Gibb & Partners).

From *The London Gazette* of December 28: Territorial Army, Royal Engineers, Engineer and Railway Staff Corps: Major Oliver Vaughan Snell Bulleid (late R.E.) to be Lieut.-Col. (December 29).

From *The London Gazette* of January 4: Supplementary Reserve of Officers, Royal Engineers, Transportation: Major J. Scott, M.C., to be Bt. Lieut.-Col. (January 1).

We regret to record the death on December 26 of Mr. R. A. D. Sewell, formerly District Engineer, Secunderabad, of the Nizam's Guaranteed State Railway.

Mr. Ernesto Ballinari has been appointed by the administrative board of the Swiss Federal Railways as Chef Principal de l'Exploitation, in succession to Mr. Matter, who will be retiring at the end of the year. Mr. Ballinari has been in railway service since 1901, and has worked under Mr. Matter for the last eight years. Mr. Matter will retain his position as President of the Union internationale pour l'Utilisation des Voitures et des Fourgons, and the Union internationale pour l'Emploi Réciproque des Wagons à Marchandises, which he has held since these organisations were founded

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in 1921. He has been entrusted with the compilation of an account of the Swiss Federal Railways' activities during the war.

CEYLON RAILWAY STAFF CHANGES

Mr. W. G. Hills, Deputy General Manager and formerly Acting General Manager, has returned from leave and resumed the latter duties. Mr. G. E. Samuels, who was acting as General Manager in his place, has reverted to his substantive post of Chief Engineer, and Mr. J. E. S. Bodger, Acting Chief Engineer, has resumed his duties as Deputy Engineer.

Mr. Kanagasaby has been appointed Acting Deputy General Manager, Administrative Section.

Mr. J. G. Smith, Acting Deputy General Manager, Operating Section, is retiring shortly. He is 52 years of age and has 25 years' service with the railway. He went to Ceylon as a Locomotive Foreman in 1912, and in 1924, when the Traffic and Locomotive Departments were amalgamated, he was promoted from the post of District Locomotive Superintendent, to Assistant Divisional Transportation Superintendent, Colombo. In 1931 he was appointed Divisional Transportation Superintendent, and has acted as Deputy General Manager on several occasions.

Sir Edward Beatty, G.B.E., LL.D., K.C., Chairman and President of the Canadian Pacific Railway, has been appointed by the Governor-General of Canada to be Honorary Captain, Montreal Division, Royal Canadian Naval Volunteer Reserve. The honour is in recognition of the interest Sir Edward takes in youth training movements, and is the first honorary rank ever created in the Canadian naval forces.

We regret to record the death on January 8 of Sir John Henry Brunel Noble, Bt., a Director of the L.N.E.R., and until 1927 Vice-Chairman of Sir W. G. Armstrong, Whitworth & Co. Ltd. Sir John Noble joined the L.N.E.R. board on the formation of the company in 1923, having previously been a Director of the North Eastern Railway. He was born in 1865, and educated at Eton and Oxford. Called to the Bar by the Inner Temple after leaving Oxford, he soon relinquished that profession and in 1895 joined Sir W. G. Armstrong, Whitworth & Co. Ltd. (of which his father, Sir Andrew Noble, the expert on explosives, was Chairman). Early in the present century he was made a Director of the company, remaining on the board until it was reconstructed in 1927. He had become deeply interested in the trade of the North-East Coast, and maintained his connection with the district through his directorship of Martins Bank Limited, the North British & Mercantile Insurance Co. Ltd., the North-Eastern Electric Supply Co. Ltd., and other concerns. He was also a Director of the Power Securities Corporation Limited, and of A. & J. Main Limited, the Glasgow firm of structural engineers. The funeral took place at Batheaston, near Bath, on January 11.

We regret to record the recent death of Mr. Henry Phillips, General Manager of the Grand Canal Company, Ireland. Mr. Phillips was born in Lucan (Dublin) and was originally employed in the Dublin-Glasgow Steam Packet Company, which he left to join the Grand Canal Company, in 1891, where in 1914 he was promoted Traffic Manager, becoming General Manager in 1919. It was under Mr. Phillips's regime that development of motor barge traffic on the Grand Canal took place, beginning about ten years ago. Mr. Phillips was a member of the Dublin Chamber of Commerce.

INSTITUTION OF LOCOMOTIVE ENGINEERS

The following elections and transfers were made at a meeting of the institution on December 15:—

Members

Mr. R. E. Trevithick, Managing Director, La Monti Steam Generator Limited, Quadrant House, Pall Mall, London, S.W.1.

Mr. W. F. Wright, Chief Depot Engineer, L.P.T.B. (Railways), Acton Works, London, W.3.

From Associate Member to Member

Mr. H. W. Charles, Technical Assistant, Liverpool Street, L.N.E.R.

Associate Members

Mr. R. K. Glascodine, Assistant Manager, Technical Department, Geo. Spencer, Moulton & Co. Ltd.

Mr. J. C. Spencer, Managing Director, Geo. Spencer, Moulton & Co. Ltd.

We regret to record the sudden death at his home in Sutton, Surrey, of Mr. W. D. Grosset, the late Canadian Pacific representative at Antwerp. Mr. Grosset retired in January, 1937. His shipping experience was gained in Glasgow with the firm of J. & A. Roxburgh, shipowners. His first appointment with the Canadian Pacific dates back to 1906, when he became Assistant to the General Traffic Agent in London. He went to Antwerp in 1913, and when war broke out arranged for the transportation of British and Belgian residents in Antwerp to London by two Canadian Pacific ships which happened to be in port at the time. On his return to London and during the war period he represented the Canadian Pacific Ocean Services in Glasgow, and later at Liverpool. In 1919, when the Canadian Pacific Ocean Services Agency (Belgium) S.A. was formed, he was appointed Managing Director, and in 1921, when the change to the Canadian Pacific Railway Agency (Belgium) S.A. was made, he was appointed to a similar position in the company, in charge of steamship and traffic interests. He was also Agent for the Canadian Pacific Express Company of Canada. Mr. Grosset was created a Chevalier of the Order of Leopold for distinguished services.

The Grand Council of the F.B.I. has nominated Mr. Peter F. Bennett, O.B.E., J.P., as President-Elect of the federation. Mr. Bennett, who is Chairman and Managing Director of Joseph Lucas Limited, has long taken a leading part in the work of the federation, and during the last year he has been assisting the President, Lord Hirst, as Deputy President. Mr. Bennett has been closely associated with the work of the Empire Committee, and he was himself present at the Ottawa Conference. He is a Past President of the Society of Motor Manufacturers and Traders.

INSTITUTE OF TRANSPORT

The following elections during December, 1937, are announced:—

Members

Mr. H. R. Caulfield-Giles, Transport and Traffic Manager, Newton Chambers & Co. Ltd.

Mr. E. S. Cranford, General Manager, North Coast Steam Navigation Co. Ltd., Sydney.

Mr. K. G. Fenelon, Director of Department of Industrial Administration, Manchester College of Technology.

Mr. C. H. Jones, Tramways Manager, Colombo Electric Tramways & Lighting Co. Ltd.

Sir John McDonald, President, Scottish Commercial Motor Users Assn.

Mr. F. C. Moat, Mason & Moat, Sydney.

Mr. G. H. Nutter, Assistant District Goods Manager, Manchester, L.M.S.R.

Mr. H. K. Rodgers, Local Chairman and Assistant General Manager, Singapore Harbour Board.

Associate Members

Messrs. F. V. Bullen (N.S.W. Government Railways), and H. E. Carter (City of Leicester Transport).

We regret to record the death in California on December 13 of Mr. Fred C. Salter, European Traffic Manager of the Grand Trunk Railway of Canada up to 1921. Mr. Salter entered the service of the Northern Railway of Canada in 1883, and became successively Freight and Passenger Agent at Toronto for the Grand Trunk Railway; Relief Freight and Passenger Agent, Grand Trunk Railway, Buffalo, N.Y.; Soliciting Agent, Commercial Empress Line, Buffalo, N.Y.; New York State Agent, Commercial Empress Line, Buffalo; Travelling Freight Agent, Northern Pacific Railway, Buffalo; and General Eastern Agent, Northern Pacific Railway, New York. In May, 1904, he was appointed European Traffic Manager, Grand Trunk Railway and Canadian Express Company. On September 1, 1921, he was appointed Manager, Foreign Department, Canadian National Express Company at Montreal, which position he held until he retired in 1928.

Sir William Wood on L.M.S.R. Revenues and Costs

In an interview to *The Financial Times* last week, Sir William Wood, Vice President, Finance and Service, L.M.S.R., surveyed the position of his company in the light of the increase in gross revenue shown for the 52 weeks of 1937, but offset by substantial rises in working costs. In June last, Sir William recalled, the Railway Rates Tribunal was informed that if the rate of increase of receipts for the first 23 weeks of 1937 was continued the L.M.S.R. addition for the year would be £2,700,000. This rate was fairly well maintained up to the end of July, but while, since then, every week had shown an improvement in volume of traffic over 1936, there had not been the same relative increase as in the first 23 weeks, because certain classes of traffic had shown less expansion. For the nine weeks of August and September, prior to the raising of charges, this tendency could be seen readily. Receipts were only 2.9 per cent. over the 1936 level, compared with 4.3 per cent. for the period to the end of July, although there was a special growth in long period season ticket issues before the increased charges applied on October 1.

For the remainder of the year the traffic as a whole continued to grow in volume. A further recession in certain of the higher-class commodities was accompanied by increases in lower-grade traffics. The extra charges from October 1 excluded all intra-London passengers and came too late to benefit the company in respect of either the summer traffic or the annual and half-yearly season tickets. But they had added to the receipts for the last 13 weeks of 1937 some £40,000 a week on average and the growth of traffic had added some £27,000 a week.

The receipts for the 52 weeks of 1935 were 84·3 per cent. of 1929; those of 1936 were 87·7 per cent.; and those of 1937 had risen to 91·6 per cent. The last four weeks of 1937, taken together, had been very satisfactory and, in fact, they were slightly over the 1929 level. For the full year of 1937 there was one less working day, and final figures would not be available for another six weeks. "The prospects for 1938, so far as we can see, indicate broadly a continuance of the experience of the last quarter of 1937, but it is difficult to look a year ahead," Sir William added.

A good recovery had been made, but it had been accompanied by a steep rise in expenditure. The extra traffic and its uneven incidence throughout the year had caused additional mileage to be run and more staff to be employed. The effect had been offset to some extent by the fruition of various economies, particularly in the use of rolling stock. The rise in expenditure owing to increased prices of materials and rates of wages was a much greater factor than the cost involved in moving the additional traffic. In June last the rise in expenditure chargeable against revenue over that for 1936 for all L.M.S.R. businesses, calculated for a full 12 months on then known prices, was given to the Railway Rates Tribunal as £3,175,000. Since then the increase in wages rates and prices of materials had added a further £1,625,000, making a total in a full 12 months of £4,800,000. Apart from the wages increases in August, the rise in the price of living had meant an addition of £220,000 to the company's rates of wages governed by the cost of living index.

The full effect of these movements would not be reflected in the 1937 working expenditure, as they included annual wages increases which would be felt mainly in 1938, and also higher prices of materials purchased for use not only in 1937 but also in 1938 and 1939. This applied more or less to all materials. Extremes were fresh vegetables for the catering department and timber for the permanent way. The former were used practically as soon as bought, while the latter might be used anywhere between three and 30 months after purchase. Although Sir William could not anticipate the effect on 1937 expenditure, he stated that it was obviously substantial. The L.M.S.R. had published in the interim dividend announcement the result of increased outgoings upon net revenue for the first half of the year. Gross receipts were there shown to have been higher by £1,410,000, but of this £780,000 had been absorbed by increased rates of wages and enhanced prices of materials, while £320,000 had gone in handling additional traffic. The result had been a net increase of only £310,000.

In reply to a question as to whether there was any indication from the traffic results of a trade slump (in the latter part of 1937), Sir William said: "No. The position varies in particular trades, but I am looking at the whole." Asked if he expected that the 1929 level of receipts would be reached in 1938, he said he thought it improbable.

Traffic Working in the Newport Division, G.W.R.

On January 6 Mr. Trevor Roberts, Divisional Superintendent at Newport, gave a lecture to the G.W.R. (London) Lecture and Debating Society on "Factors in the Working of Passenger and Freight Traffic in the Newport Division." Mr. F. R. Potter, Superintendent of the Line, G.W.R., was in the chair.

Mr. Roberts first gave a geographical and physical survey of his division in order to show how the varieties of passenger and freight traffic arose. The line mileage of the division was 267, including 102 miles of single line, serving some portions of Monmouth, Glamorgan, Breconshire, Hereford, and Gloucester. Gradients were frequent, and some of them as steep as 1 in 40 for passenger trains, and 1 in 20 for freight. The G.W.R. docks, fitted with the most modern appliances, and river wharves for vessels of 6,000 or 7,000 tons capacity, were provided with direct access to the main Paddington-South Wales line, the Eastern and Western Valleys, and Vale of Neath lines. Coal carried from approximately 80 collieries was the principal export from these docks. It was a division with considerable operating variety.

Concerning passenger working, the importance of the migration from South Wales as a "special area" to both London and the Midlands should be noted. One result of this could be seen in the fact that some 37,000 passengers travelled from Paddington to South Wales during the Christmas holiday, and some 7,000 from the Birmingham area.

The geography of the division meant that most of the passengers alighting at Newport were bound for stations in the valleys which radiated from that place, and there was therefore a problem of maintaining the connections. In practice, during busy periods the connecting branch trains were started at the scheduled times and special trains run as necessary. Winter passenger traffic was influenced to a great extent by the popularity of sport in South Wales. For instance, the Rugby International next month at Edinburgh would necessitate at least eight trains from the division alone. This traffic was maintained even at the bottom of the trade depression. Association football regularly drew a good following to Newport from the valleys. In the summer a major operating problem was the conveyance of people to the Newport carnival from the valleys. Sometimes it was necessary to run over twenty special trains between 2.0 p.m. and 4.0 p.m., but recently the valley towns' own carnivals had somewhat reduced this traffic.

The working of colliers' trains was a typical feature of the division; they had to be timed for the shifts and this adversely affected the working of freight traffic. Such a change as the existence of pit head baths at most collieries had a bearing on the use of more comfortable rolling stock. In an area having good educational facilities it was natural that educational excursions should be popular, and the improvement in local production had resulted in an increase in Sunday school traffic. Sunday half-day excursion traffic was as popular as anywhere. Generally, so far as passenger work was concerned it could be said that in spite of road competition a fair

proportion of traffic had been retained. Today the increased spending power in the division was apparent from the additional revenue.

The division was primarily an industrial area, and the goods traffic was mainly coal and the requirements and products of heavy industry. The colliery working was complicated by several factors; for example, the variety of layout and gradient; of classes and sizes of coal; and irregular forwardings of coal. In recent years the transfer of small coal from colliery to washery had increased. The difficulties involved in shunting which had to be overcome were of another kind. A feature of the Western Valley was the extent to which the fairly intensive passenger and colliery train service interfered with the work at the collieries, a good deal of it having to be done direct from the main line. The heavy gradients in that part, limiting the maximum loads and the shortness of haul, made it difficult to raise the train-miles per hour to a high figure. Mr. Roberts described the regular system of colliery trains and also the frequent emergency workings put into operation by the control office. Probably no other branch of industry received the same degree of special attention. Rogerstone hump yard had reduced the shunting at colliery sidings. At this yard, where the points were worked by an electro-pneumatic system, a train of 76 wagons, necessitating 20 cuts, had been shunted in 12 min. and the method of shunting had kept damage at a minimum. Marshalling yards at five places had an important influence on the whole system.

An unusual feature in this division was the working of the Severn tunnel, which involved the use of a large amount of banking power and special tunnel brake vans, influencing very considerably the situation at Severn Tunnel Junction yard. At Newport 550 trains passed during the 24 hr., and the electrical signalling system had been of the greatest use in maintaining easy working. All these activities took place against a background of weather conditions which were often severe, the top of the valleys being in places over 1,000 ft. above sea level.

VISITORS TO THE REICHSBAHN.—During 1937 some 1,760 visitors from 40 different countries inspected the German State Railway. Of these the largest number, 510, went from Great Britain; 150 from Italy; 115 from Austria; and 100 from Poland. Most were taking part in tours of inspection, and 29 travelling commissions of this kind visited Germany during the year. The Institute of Transport party alone totalled 190. Some 80 British railway signal engineers viewed the German signalling apparatus and technique last year; 400 foreign visitors inspected the overhaul and repair works of the German railways; and 300 saw the new extension of the North-South tube railway in Berlin.

RAILWAY AND OTHER MEETINGS

London & North Eastern Railway Company

An extraordinary general meeting of the proprietors of the London & North Eastern Railway Company was held in the board room, Marylebone station, London, N.W.1, on January 7, Mr. William Whitelaw, Chairman of the company, presiding.

The Secretary (Mr. J. McLaren) read the notice convening the meeting.

The Chairman explained that the meeting had been called to appoint an Auditor who would have time to examine the accounts for 1937 and be able to sign them at the end of February. The vacancy had arisen through the lamented death of their old friend Sir Albert Wyon, who had been Auditor for some years since the death of Sir Gilbert Garnsey. They very greatly regretted his passing, and desired to express their regret not merely as a board but as a company, at the loss of his services.

The Secretary then read the minute of the audit committee held on January 5, as follows: "The committee unanimously resolved to recommend to the proprietors at the extraordinary general meeting to be held on January 7, 1938, that Sir Laurence Halsey, K.B.E. F.C.A., be elected an Auditor of the company in place of Sir Albert W. Wyon, K.B.E., deceased."

The Chairman called upon Sir Berkeley Sheffield to move the election of Sir Laurence Halsey; and the motion, seconded by Mr. R. Salomonson, was carried unanimously.

Midland Railway Co. of Western Australia Ltd.

The annual general meeting of the Midland Railway Co. of Western Australia Ltd. was held at Winchester House, Old Broad Street, London, E.C., on January 13, Mr. William Sandford Poole, Chairman of the company, presiding.

The Secretary (Mr. William Tait) read the notice convening the meeting and the auditors' report.

The Chairman, before moving the adoption of the report and accounts, said it was his sad duty to refer to the great loss which the company and the directors had sustained by the death on October 25 of their valued colleague and friend, Mr. Andrew Williamson. He had been a Director of the company for 36 years—occupying the chair for nearly 3 years. During that long period of more than one-third of a century his wide— he might almost say unique—knowledge of Australian affairs was always at the disposal of the board. His advice was of the greatest value in the direction of the affairs of the company. Mr. Williamson was a man of conspicuous ability, tireless energy, and outstanding integrity. He also possessed a very lovable nature, and the directors mourned the passing of a charming and dear colleague. The vacancy on the board had been filled by the appointment of Mr. Colin Bousfield Broome, who was the London Manager of a large Australian merchant business.

Dealing with the report and accounts, the Chairman said the gross traffic receipts for the year were £155,207, compared with £161,371 for the previous year, a decrease of £6,164. The net traffic receipts were £80,713. For the year to June 30, 1936, they were £86,730, a decrease of £6,017. The working expenses, totalling £74,494, compared with £74,641 for 1936, a decrease of £147, whilst the ratio of the working expenses to the gross receipts was 48 per cent., as against 46·25 per cent. for the previous year. The increased ratio was partly due to the decrease in gross receipts, and also partly to the changes in the regulated basic wage, and long service leave. Considering that the year under review was stated to have been one of the worst the State had experienced for some time past, the actual results were very creditable.

Train-mileage was 250,384, as compared with 276,858. Owing to the economy exercised in the number of train-miles run, the earnings per train-mile were improved to 148·77d., as compared with 139·89d. in the previous year, but the working expenses per train-mile increased from 64·87d. to 71·89d. Expenditure for the past year was £53,037, as compared with £52,004 in the previous year, and £27,084 in 1935. There was every probability of an increasing annual amount being required to overtake the arrears of renewals which accumulated during the years following the world financial crisis, and looking three years ahead it was probable that expenditure of this nature would average not less than £50,000 a year. A sum of £35,000 had been transferred to depreciation and renewals account towards meeting the sum incurred last year. He regretted they had been unable to declare an ordinary dividend, but in the circumstances he was sure shareholders would agree that the policy of conserving the company's liquid resources during the difficult years was a wise one.

The report and accounts were unanimously adopted.

Forthcoming Meetings

JAN. 18 (*Tues.*).—**Rohilkund & Kumaon Railway Company** (Annual), 237, Gresham House, Old Broad Street, E.C.2, at 12 noon.

JAN. 25 (*Tues.*).—**Bengal & North Western Railway Company** (Ordinary General), Winchester House, Old Broad Street, E.C., at 12 noon.

Staff and Labour Matters

Radio Officers—Wages

Under an agreement between the principal wireless companies and the Association of Wireless and Cable Telegraphists, rates of pay for radio officers in the British Merchant Navy were increased from January 1, 1938. The new rates range from £7 17s. 6d. to £12 0s. 0d. a month for men with limited experience; and from £14 15s. 0d. to £20 10s. 0d. a month (according to tonnage of vessel and number of persons carried) for men with not less than three years' experience as an operator at sea, in addition to various allowances. Prior to the agreement radio officers were graded as wireless operators, and the change in status will enable them to become members of the Merchant Navy Officers' Pension Fund, which confers a pension at the age of 65.

London Peak House Traffic Congestion—Staggered Hours

The annual report of the London and Home Counties Traffic Association Committee, issued on Monday, January 10, contains a suggestion for relieving congestion in London trains, tubes, buses, and trams at peak hours by staggering the hours of staff employed by the big firms and organisations. The report states: "While it may not be practicable generally to stagger the hours of work, some relief during the peak hours would be obtained by appropriate adjustments of the starting time in the case of establishments employing large staffs, and secondary and technical schools where the starting time materially adds to the peak loads on certain sections of line."

Imperial Chemical Industries Wages

Under a recent agreement between Imperial Chemical Industries Limited, and 23 trade unions, a new standard code of working conditions in all the factories and works owned by Imperial Chemical Industries, except the metal group, was introduced on January 3. The following is a brief summary of the provisions of the agreement:—

Hours—Day workers, 47 a week. Shift workers, 48 a week.

Mealtimes—To be subject to local arrangement.

Overtime—All time worked in excess of normal hours to be paid for at the rate of time-and-a-half.

Sunday work—All time worked between midnight Saturday and midnight Sunday to be paid for at the rate of double time.

Bank and Public Holidays—Work on these days (six a year) to be paid for at the rate of double time.

Night work—To be paid for at the rate of time-and-one-sixth.

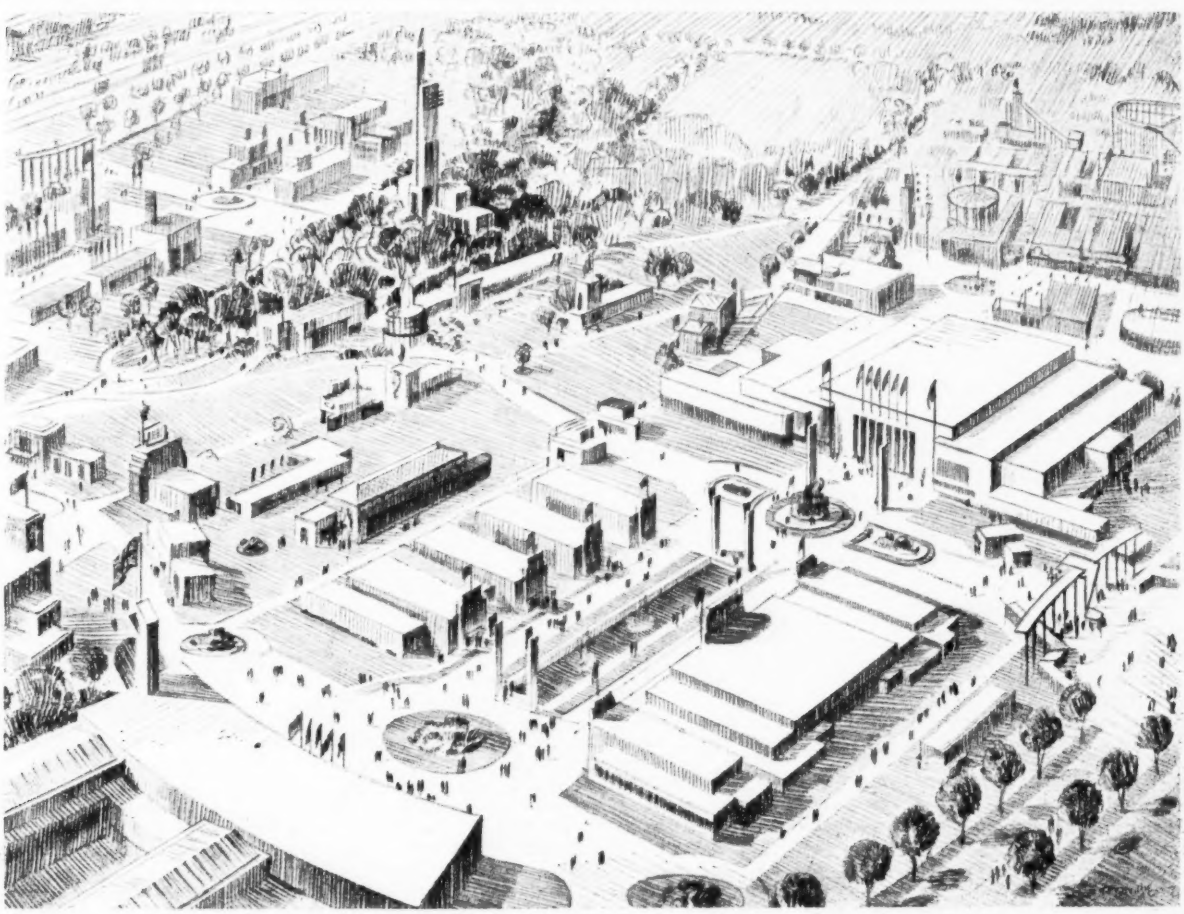
Shift Allowance—Male workers aged 21 or over, 1½d. an hour. Youths under 21 and females, ¾d. an hour.

Piecework Prices—To yield at least 25 per cent. over basic rate.

Service Bonus—Workers to whom the agreement applies to receive a service bonus on the following scale:—

After	5 years'	service...	1s. 0d.	a week.
,,	10 ,,	,, ...	2s. 0d.	,,
,,	15 ,,	,, ...	3s. 0d.	,,
,,	20 ,,	,, ...	4s. 0d.	,,
,,	25 ,,	,, ...	5s. 0d.	,,

Holidays—One day for every two months' service, subject to a maximum of one calendar week a year.



The Empire Exhibition, which is to be held from May to October, will occupy 175 acres in Bellahouston Park, Glasgow. The perspective above gives a general impression of the layout of the buildings dominated by the 300-ft. observation and beacon tower

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RAILWAY AND OTHER REPORTS

Rohilkund & Kumaon Railway Co. Ltd.—The board recommends a final dividend for the year ended September 30, 1937, of 6 per cent., together with a bonus of 5 per cent. on the company's ordinary stock, making with the *ad interim* dividend of 4 per cent. and bonus of 3 per cent. paid in July, 1937, a total of 18 per cent. per annum. The dividend and bonus will be paid less income tax at 2s. 8d. in the £ on January 22.

Manx Electric Railway.—The annual report for the year ended September 30, 1937, shows gross receipts of £36,054, against £33,516 in the previous year. Total expenses were £23,013, against £25,114, leaving a net amount of £13,041, compared with £8,402 last year, reducing the debit balance to £497. With £8,230 interest on debenture stock, the debit carried forward is £8,728. The ratio of expenses to receipts was 63·83 per cent. compared with 74·93 per cent.

Mexican Southern Railway.—According to the directors' report for the year ended December 31, 1936, this company's lines are included in the schemes of arrangement of 1927 and 1931, under which the net earnings of the Interoceanic group are pooled. The operating of the Interoceanic system for the year 1936 having resulted in a loss no amount is receivable by the company for payment on account of debenture interest under the schemes of arrangement. Balance on income account brought forward was £3,827, and the carry forward was £3,817.

The Kassala and Gedaref Railways.—The report for the year ended October 31, 1937, states that the Kassala-Gedaref-Makwar line, which forms part of the main system in the Sudan, has been operated throughout the year by the Sudan Railways under the terms of the construction contract. The obligations of the Sudan Government in respect of the payment of the instalments of the purchase price of the works have been duly fulfilled. These instalments are sufficient to cover the debenture service and other expenses incurred by the company.

Argentine Transandine Railway.—Debit on revenue account to June 30, 1937, was £9,613, against £14,338 in the previous year. Deducting interest on investment representing "A" debenture stock guaranteed fund £4,414, investments and deposits £2,725, interest and profit on sale of bonds £741, registration fees and transfer from exchange difference reserve £1,656, a debit is left of £41, against £5,493. Adding interest on "A" debenture stock £12,407, interest on "B" debenture stock £18,407, and interest on arrears of "B" debenture stock interest £3,497, makes total debit £34,352, against £39,067, which increases debit forward to £156,708. The Government is to take control of line and become responsible for reconstruction. Congress has not yet dealt with matter, but it is hoped that the agreement will soon receive approval, when a scheme of arrangement will be submitted for adjusting interests of debenture and shareholders affected by the sale of the property.

Karachi Port Trust.—The annual report for the financial year 1936-37 shows receipts on revenue account Rs. 74,15,000 against Rs. 70,44,000 in 1935-36, a rise of 5·26 per cent. Total expenditure was Rs. 71,05,000, against Rs. 67,74,000, or 4.89 per cent. more, the surplus being Rs. 3,10,000. A sum of Rs. 79,105 was withdrawn from the Reserve Fund for capital works and an amount of Rs. 9,389 was credited to it on account of profit on interfund transfer of scrip. At the end of the year the Reserve Fund stood at Rs. 52,29,013. The capital debt at the year end was Rs. 4,09,09,000 and the sinking fund for the debt stood at Rs. 2,12,80,000.

Samana & Santiago Railway.—Gross receipts for the year ended December 31, 1936, were £17,945, compared with £29,207 in 1935. Expenditure was £22,359 against £25,274, the loss on working being £4,415, which with net revenue items made a deficiency for the year of £6,555, compared with a profit in 1935 of £1,778. The debit balance brought forward was £21,425, now increased in the carry forward to £27,979. Ratio of working expenses to receipts was 124·6 per cent., compared with 86·53 per cent. in the previous year. Train mileage was 27,488, against 34,026, and the tonnage of goods carried was only 16,970, as compared with 25,938 tons in 1935, a decrease of 8,968 tons, or over 34 per cent.

Interoceanic Railway of Mexico (Acapulco to Vera Cruz) Limited.—No settlement having been obtained of the company's claims against the Mexican Government in respect of revolutionary damages and Government retention of the line from 1914 to 1925, the directors are not in a position to present a revenue account for the year 1936. Increased trading activity accounted for an increase of 943,000 pesos, gross earnings reaching record figures. Unfortunately operating expenses were higher by 2,498,000 pesos, due to the rise in the minimum wages and payment for the weekly restday conceded by the Presidential decree of October, 1935. Labour costs absorbed no less than 67 per cent. of the total receipts. According to the returns received from the National Railways of Mexico, operating managers of the Interoceanic system, the loss for 1936, computed at the exchange rate of 10 pesos to the £, amounted approximately to £350,000, compared with £226,000 in the previous year. Balance at debit of net revenue in respect of the 10 years to December 31, 1936, of the prescribed period covered by the schemes of arrangement of 1927 and 1931, amounted to some £1,406,000. Before bringing into account any credit in respect of the claims, the total amount at debit of general net revenue amounted to £5,215,000, including operating losses, unpaid debenture interest, and rentals of leased lines to December 31, 1926. In July last a Presidential Decree was published expropriating the National Railways, but consequential rearrangements in administration have not yet been announced.

National Provincial Bank Limited.—The directors report that, after making provision for rebate of discount on current bills, and after making a transfer to the credit of contingencies account, out of which account provision for all bad and doubtful debts has been made, the net profit for the year ended December 31, 1937, was £1,874,960 and £970,667 was brought forward. A final dividend of 7½ per cent., making 15 per cent. for the past year, less income tax, is now declared, payable on January 28. The dividend for the year absorbs £1,421,912; £100,000 is placed to Bank Premises Account; £250,000 is placed to Pension Fund; £500,000 to Reserve Fund; and £573,715 is carried forward to 1938.

Glyn, Mills & Co.—The balance sheet of this well-known private banking firm shows total assets at December 31, 1937, of £42,477,634. To this sum £5,966,898 was contributed by coin, bank notes, and balance at the Bank of England; £2,878,197 by balances with, and cheques in course of collection on, other banks in the United Kingdom; and £10,552,599 by investments. The company has £9,387,894 invested in British Government securities. Money at call and at short notice totalled £9,349,950; and bank premises were valued at £620,000 freehold, and £120,000 leasehold (both at cost, less amounts written off). The reserve fund stood at £530,000; and current, deposit and other accounts (including provision for contingencies) at £3,222,131.

Lincolnshire Road Car Co. Ltd.—The total revenue of this company, which is controlled jointly by the L.M.S. and L.N.E. Railway Companies and Tilling & British Automobile Traction Limited, for the year ended September 30, 1937, was £264,704 against £244,766. After deducting all expenses and providing for depreciation there is a balance of £23,071 which, added to £10,075 brought forward, makes a total of £33,146 against £30,073. From this the directors propose to appropriate £5,000 to General Reserve (same as last year) to pay a dividend of 10 per cent. for the year, absorbing £17,499 (against £14,998) and to carry forward £10,647. During the year the authorised capital was increased by the creation of 50,000 ordinary shares of £1 each, which were issued to shareholders at par. Certain new businesses were acquired; the garages at Grantham and Sleaford were extended; and a new bus station was erected at Skegness.

NOTES AND NEWS

The Ballyclare Branch, Northern Ireland.—The L.M.S.R. (N.C.C.) on January 1, 1938, discontinued the passenger train service between Belfast and Ballyclare. The Ballyclare branch, however, continues in use for goods and parcels traffic.

Baltimore & Ohio Railroad Loan.—The Interstate Commerce Commission has conditionally approved the R.F.C. loan of $8,223,000 to the Baltimore & Ohio Railroad. The loan has already been authorised by the Reconstruction Finance Corporation.

New Uxbridge Station, L.P.T.B.—Modified plans are to be carried out by London Transport for the new railway station, bus station, and shopping centre at Uxbridge, described in our issue of March 26 last. Engineering work has been in progress for some time, but the design of the station has been altered to make it more impressive in appearance and to enable passengers to transfer more easily between buses and trains. A building contract amounting to nearly £100,000 has been let, as recorded in our Contracts and Tenders page this week.

Institution of Electrical Engineers: Annual Dinner.—The annual dinner and reunion of the institution will be held in the Great Room, Grosvenor House, Park Lane, W.1, on Thursday, February 10, under the presidency of Sir George Lee, O.B.E., N.C. The charge is 12s. 6d. for each cover, exclusive of wine, and early application for tickets should be made to the Secretary, Mr. P. F. Rowell.

Silencing London Tube Travel.—Screens of asbestos are to be fixed to the ribs of the cast-iron tubes over a distance of 2¾ miles between Golders Green and Camden Town for the purpose of reducing the noise of travel. Between the screens and the cast-iron lining special noise-absorbing material will be packed. It is estimated that this, together with the welding of rails and the elimination of corrugations in the rails by an improved rail-grinding car, will reduce noise by 60 per cent.

Additional L.N.E.R. Camping Coaches.—For the 1938 holiday season, the L.N.E.R. is converting three bogie passenger coaches to serve as camping coaches, each of which will be capable of accommodating eight people. The new coaches will be placed at selected sites at Trimingham, Mundesley-on-Sea, and Overstrand on the Norfolk coast. When these coaches are available, the L.N.E.R. will have a stock of 118 camping coaches and one touring camping coach for hire during the 1938 holiday season.

Southern Railway Road-Van Advertising.—On January 1 the Southern Railway took over the sole control of advertising on its road-vans throughout the system. The Southern Railway road-van system is divided into 105 areas, each of which is served by a depot. All communications should be addressed to the Trade Advertising Agent, Southern Railway, Cannon Street station, E.C.4.

Canadian National Earnings.—Gross earnings of the Canadian National Railways for the month of November, 1937, amounted to $16,773,527, an increase of $621,853 in comparison with November, 1936. In the working expenses of $14,854,300 there was an increase of $1,085,897, leaving net earnings $464,044 lower at $1,919,227. Aggregate gross earnings for the first 11 months of 1937 were $182,177,183, an improvement of $12,790,919, and the net earnings of $15,878,665 were higher by $3,651,414.

Canadian Pacific Earnings.—Gross earnings of the Canadian Pacific Railway for the month of November, 1937, amounted to $12,992,000, an increase of $875,000 in comparison with November, 1936. In the working expenses of $9,528,000, there was an increase of $950,000, leaving net earnings $7,500 lower at $3,464,000. Aggregate gross earnings for the first 11 months of 1937 were $132,823,000, an improvement of $6,513,000, and the net earnings of $20,817,000 were higher by $1,048,000.

Mr. Cecil J. Allen's Lectures at the R.S.A.—At his second lecture to boys on "Railway Wonders of the World," under the auspices of the Royal Society of Arts in London on January 12, Mr. Cecil J. Allen dealt with the tracks over which the trains run, including main lines, and spectacular rack-and-pinion and cable ascents in the Alps, railway gauges from a 1¼-in. gauge line in the lecturer's own garden to the one-time 7-ft. gauge of the Great Western Railway, and, last, the design and erection of such famous bridges as those spanning the Forth and Sydney Harbour.

Suggested London Tube Extensions.—In the recently-issued annual report of the London and Home Counties Traffic Advisory Committee for the year ended September 30, 1937, two railway matters are recorded as having come before the committee under Section 59 of the London Passenger Transport Act, 1937, which relates to representations regarding the services and facilities of the London Passenger Transport Board. The requirements of the East Ham Civic Organisation are dismissed briefly, but those of North Surrey receive detailed consideration. The various local authorities in the latter area have suggested new tube lines, such as from Tooting Broadway to Carshalton, and doubling the existing line between Kennington and Morden with an extension to Epsom. The report sets out detailed consideration of the reasons resulting in the advisory committee's decision that it would not be justified in making representations to the London Passenger Transport Board in the matter. Brief reference to the suggestion for staggering working hours is made this week in our Staff and Labour columns.

Road Accidents.—The Ministry of Transport returns for December of persons killed or injured in road accidents is as below. The figures in brackets are those for the corresponding period of 1936 :—

	Killed	Injured	
		Serious	Slight
England—			
Pedestrians ...	277 (332)	1,359	4,325
Others	252 (272)	2,319	8,516
Wales—			
Pedestrians ...	21 (14)	82	140
Others	5 (12)	95	231
Scotland—			
Pedestrians ...	30 (47)	178	425
Others	9 (17)	159	571
	594 (694)	4,192	14,208

The total fatalities for the preceding month were 556, comparing with 639 in the corresponding period of 1936. In the 12 months of 1937 there were 6,591 fatalities on the roads of Great Britain, as against 6,561 in 1936. Injuries (serious and slight combined) were 226,339 in 1937 and 227,813 in 1936.

Northern Ireland Traffics.—Passenger receipts for the first ten months of 1937 on railways wholly in Northern Ireland amounted to £259,579 against £255,692 for the corresponding period of 1936, and the number of passengers carried (excluding season-ticket holders) rose from 5,274,275 to 5,296,017. Merchandise and mineral tonnage for the ten months fell from 496,832 tons to 485,355 tons and the total goods traffic receipts fell from £183,611 to £176,391. Railways partly in Northern Ireland carried 4,989,011 ordinary passengers in the first ten months of 1937 against 5,043,710 for the corresponding period of 1936, but the total passenger receipts rose from £401,080 to £416,155. The quantity of merchandise and minerals carried fell from 776,046 tons to 766,874 tons, and the total goods traffic receipts fell from £526,531 to £518,320. On the purely northern railways the number of livestock carried in the first ten months of 1937 rose from 164,117 to 209,438, and on the cross-border railways from 627,254 to 639,342.

The Development of North China.—According to a Reuters message from Tokyo, a specially appointed committee has recommended to the Japanese Government that a powerful corporation should be established to control the essential industries in North China, but that—contrary to expectation—neither the South Manchuria Railway nor its Japanese subsidiary, the China Development Company, should be allowed to extend its activities to North China. The reason given for the latter recommendation is that the political circumstances in China are quite different from those in Manchukuo, in which the two companies are primarily

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interested. The new corporation is to control railways, harbour, port, and highway construction, general transportation facilities, telegraphs, telephones, electric power, and coal, iron, and gold mining. A franchise is to be obtained from the provisional Peiping Government for railway interests, which may be controlled by a subsidiary company, in which the S.M.R. may be allowed to invest and to which it may give technical assistance without actually operating any of the lines.

L.M.S.R. Excursions.—The development of railway excursion traffic in the winter months is strikingly illustrated by plans made by the L.M.S.R., which proposes to run nearly 3,000 half-day and evening excursions in England and Wales alone during the four months ended May 1. These trains will have aggregate seating accommodation for over 1,000,000 passengers. Although there are nearly a hundred more half-day trains being run as compared with evening trips, it is estimated that the latter will carry at least 100,000 more passengers, owing to the great popularity of the evening excursions, which are run at very low fares. Over the Easter holiday period the L.M.S.R. will run 331 half-day excursions and 139 evening trips, the "peak" day being Easter Monday, when 142 half-day trips will be run.

"Dry Ice" Refrigeration in South Africa.—An experiment is being made by a private company in Cape Town with a truck hired from the railway administration, on which a refrigerator container has been constructed, the refrigerating medium being "dry ice," and it is understood that a private test has been carried out by the company with a view to the transport of fish for long distances in warm weather. The administration's officers, in conjunction with scientists of the Department of Agriculture, are at present engaged on a series of tests to ascertain the best type of "cool truck" for its various purposes, and the best type of refrigerating medium. The tests are of a most exhaustive character, and two years will probably elapse before the administration decides on a definite policy in regard to refrigerator trucks.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 1st Week			Totals to Date		
	1938	1937	Inc. or Dec.	1938	1937	Inc. or Dec.
L.M.S.R. (6,867 mls.)	£	£	£	£	£	£
Passenger-train traffic...	381,000	364,000	+ 17,000	381,000	364,000	+ 17,000
Merchandise, &c. ...	450,000	449,000	+ 1,000	450,000	449,000	+ 1,000
Coal and coke ...	301,000	277,000	+ 24,000	301,000	277,000	+ 24,000
Goods-train traffic ...	751,000	726,000	+ 25,000	751,000	726,000	+ 25,000
Total receipts	1,132,000	1,090,000	+ 42,000	1,132,000	1,090,000	+ 42,000
L.N.E.R. (6,315 mls.)						
Passenger-train traffic...	261,000	248,000	+ 13,000	261,000	248,000	+ 13,000
Merchandise, &c. ...	296,000	309,000	− 13,000	296,000	309,000	− 13,000
Coal and coke ...	256,000	238,000	+ 18,000	256,000	238,000	+ 18,000
Goods-train traffic ...	552,000	547,000	+ 5,000	552,000	547,000	+ 5,000
Total receipts	813,000	795,000	+ 18,000	813,000	795,000	+ 18,000
G.W.R. (3,739¼ mls.)						
Passenger-train traffic...	166,000	163,000	+ 3,000	166,000	163,000	+ 3,000
Merchandise, &c. ...	188,000	182,000	+ 6,000	188,000	182,000	+ 6,000
Coal and Coke ...	123,000	117,000	+ 6,000	123,000	117,000	+ 6,000
Goods-train traffic ...	311,000	299,000	+ 12,000	311,000	299,000	+ 12,000
Total receipts	477,000	462,000	+ 15,000	477,000	462,000	+ 15,000
S.R. (2,147 mls.)						
Passenger-train traffic...	263,000	252,000	+ 11,000	263,000	252,000	+ 11,000
Merchandise, &c. ...	50,000	53,500	− 3,500	50,000	53,500	− 3,500
Coal and coke ...	31,000	30,500	+ 500	31,000	30,500	+ 500
Goods-train traffic ...	81,000	84,000	− 3,000	81,000	84,000	− 3,000
Total receipts	344,000	336,000	+ 8,000	344,000	336,000	+ 8,000
Liverpool Overhead ... (6½ mls.)	1,422	1,273	+ 149	1,422	1,273	+ 149
Mersey (4⅜ mls.) ...	4,775	4,698	+ 77	4,775	4,698	+ 77
*London Passenger Transport Board ...	567,900	546,700	+ 21,200	15,731,600	15,700,100	+ 31,500
IRELAND						
Belfast & C.D. pass. (80 mls.)	1,781	1,667	+ 114	1,781	1,667	+ 114
,, ,, goods	340	391	− 51	340	391	− 51
,, ,, total	2,121	2,058	+ 63	2,121	2,058	+ 63
Great Northern pass. (543 mls.)	8,700	8,100	+ 600	8,700	8,100	+ 600
,, ,, goods	6,300	7,200	− 900	6,300	7,200	− 900
,, ,, total	15,000	15,300	− 300	15,000	15,300	− 300
Great Southern pass. (2,076 mls.)	28,822	28,310	+ 512	28,822	28,310	+ 512
,, ,, goods	45,944	43,070	+ 2,874	45,944	43,070	+ 2,874
,, ,, total	74,766	71,380	+ 3,386	74,766	71,380	+ 3,386

* 28th week (before pooling)

British and Irish Railway Stocks and Shares

Stocks	Highest 1937	Lowest 1937	Prices Jan. 12, 1938	Prices Rise Fall
G.W.R.				
Cons. Ord. ...	67⅝	55¾	61½	−3¼
5% Con. Prefce. ...	127	108	117½	—
5% Red.Pref.(1950)	113	109	110½	—
4% Deb.	113⅝	102½	109½	+½
4¼% Deb.... ...	118	106	110½	+1
4½% Deb.	124½	112	117½	—
5% Deb.	136½	122¾	128½	+1
2½% Deb.... ...	76	64	68½	—
5% Rt. Charge ...	133 7/16	118	126½	—
5% Cons. Guar. ...	133¾	116½	127	+½
L.M.S.R.				
Ord.	36⅛	25⅝	28	−2
4% Prefce. (1923)	82½	65¾	68	−2
4% Prefce. ...	92½	77¾	81	−1
5% Red.Pref.(1955)	107¾	102	103	−½
4% Deb.	108	99¼	104½	+½
5% Red.Deb.(1952)	117½	111	113½	—
4% Guar. ...	104	95⅞	102	+½
L.N.E.R.				
5% Pref. Ord. ...	12½	6¾	8	−½
Def. Ord.	6¼	3⅝	4⅛	−¼
4% First Prefce.	79½	63	67	−½
4% Second Prefce.	31½	21	26	−1
5% Red.Pref.(1955)	101¼	89¾	96½	—
4% First Guar. ...	103	91⅞	96½	+½
4% Second Guar.	97⅝	85½	90½	+½
3% Deb.	84⅛	74	79	+½
4% Deb.	107¼	98½	103½	+½
5% Red.Deb.(1947)	113½	106½	110½	—
4½% Sinking Fund Red. Deb.	110 5/16	105½	107	—
SOUTHERN				
Pref. Ord.... ...	98⅝	83½	84	−3
Def. Ord.	27⅞	16¾	19	−1¼
5% Pref.	126 1/16	105 13/16	114½	—
5% Red.Pref.(1964)	118	110¼	113½	—
5% Guar. Prefce.	133¾	116¾	127	+1
5% Red.Guar.Pref. (1957)	118½	111½	115	—
4% Deb.	112	101¼	108	+1½
5% Deb.	135¾	123½	127½	+2
4% Red. Deb. 1962–67	113	105	106½	+1
BELFAST & C.D.				
Ord.	5	4	4½	—
FORTH BRIDGE				
4% Deb.	106	99½	100½	—
4% Guar. ...	105¾	99	100½	—
G. NORTHERN (IRELAND)				
Ord.	11	5	5½	—
G. SOUTHERN (IRELAND)				
Ord.	50	21½	27½	+½
Prefce.	61	34	36	+1
Guar.	94¾	69½	67	—
Deb.	95	82⅛	81½	−¼
L.P.T.B.				
4½% "A" ...	123¾	110½	118½	+1
5% "A" ...	135	121½	127½	—
4½% "T.F.A." ...	108¾	104	106	—
5% "B" ...	125	114½	120½	—
"C"	99¾	75	79½	−½
MERSEY				
Ord.	42⅝	22	21½	—
4% Perp. Deb. ...	103	96¾	101	+4
3% Perp. Deb. ...	77⅝	74½	75½	—
3% Perp. Prefce.	68¾	61¼	66½	—

CONTRACTS AND TENDERS

J. Jarvis & Sons Limited has received a contract, worth approximately £100,000, from the London Passenger Transport Board for the buildings required at the new railway station, bus station, and shopping centre at Uxbridge. The architects are Messrs. Adams, Holden & Pearson.

Wagons for Siam

The Siamese State Railways Administration has placed orders in Germany for a total of 150 metre-gauge all-steel low-sided four-wheeled wagons, to be supplied to the inspection of Messrs. Sandberg and divided as follow: Gebrüder Crede & Company, 100 wagons; and Triebwagen und Waggonfabrik, Wismar, 50 wagons.

J. Baker & Bessemer Limited has received an order from the Great Western of Brazil Railway for 110 locomotive axles, and 62 locomotive and 300 carriage and wagon tyres.

The Assam-Bengal Railway Administration has placed the following orders to the inspection of Messrs. Rendel, Palmer & Tritton:

Monkbridge Iron & Steel Co. Ltd.; 34 Sorbitic locomotive tyres.

Brown Bayley's Steelworks Limited; five locomotive and 30 wagon axles.

Bochumer Verein A.-G.; 36 locomotive and 600 carriage and wagon tyres.

The Anderston Foundry Co. Ltd. has received an order from the Jodhpur Railway Administration to the inspection of Messrs. Rendel, Palmer & Tritton, for 27 sets of 1 in 12 crossings and 27 sets of 15-ft. switches.

The Associated Equipment Co. Ltd. has received a repeat order from the Bristol Tramways & Carriage Co. Ltd. for three oil-engined Regal passenger vehicles.

Willment Bros. has received a contract from the L.P.T.B. for the erection of noise-reducing screens in 5½ miles of tunnel between Golders Green and Camden Town. The amount of this contract is approximately £15,000. The screens will consist of asbestos sheets; behind which a special noise-absorbing material will be packed. Tests have shown that these screens, together with welded rails and the use of a perfected rail-grinding car, will reduce train noise by 60 per cent.

Ransomes & Rapier Limited has received orders from the L.M.S.R. for seven Mundt-type locomotive turntables, arranged for hand or vacuum operation, and divided as follow: six of 60-ft. dia. for installation respectively at Kettering, Nuneaton, Northampton, Lostock Hall, Sowerby Bridge, and Warwick; and one of 50-ft. dia. for installation at Irwell Bridge, Manchester.

Reavell & Co. Ltd. has received an order from the Madras & Southern Mahratta Railway Administration, to the inspection of Messrs. Rendel, Palmer & Tritton, for one motor-driven vertical reciprocating air compressor of 450 cu. ft. of free air per minute at 100 lb. gauge pressure capacity for installation at Hubli.

Suren Piras & Company has received an order from the Indian Stores Department (Engineering Section) for 135 locomotive and tender tyres.

Krupp Indian Trading Co. Ltd. has received an order from the Indian Stores Department (Engineering Section) for 500 locomotive and tender tyres and 50 tyres for electric locomotives.

Wm. Jacks & Co. has received an order from the Indian Stores Department (Engineering Section) for 209 locomotive and tender tyres.

Shaw, Wallace & Co. has received an order from the Indian Stores Department (Engineering Section) for 208 broad gauge carriage and wagon straight axles.

The Britannia Engineering Co. Ltd. has received orders from the East Indian Railway Administration for a number of signal lever frames.

The G.W.R. announces the following works to be undertaken:—

Dingle Road, Penarth.—The up platform is to be lengthened, and additional waiting room accommodation provided.

Filton Junction.—Additional goods station accommodation is to be provided to deal with the greatly increased traffic following extensive industrial and residential development in the district. The scheme includes the provision of two additional mileage sidings, a goods platform with small shed, offices and stores, and a 20-ton cart weighbridge.

Fishguard Harbour Station.—Movable platforms are to be provided, to expedite the handling of traffic from Ireland at Christmas and on other special occasions, and also to afford an improvement in the facilities for Customs examination.

Hayes and Harlington.—Additional holding sidings are to be provided on the up side, to enable the substantially increased goods traffic to be dealt with with greater expedition and facility.

Neachley.—A halt is to be provided at Neachley between Albrighton and Shifnal stations to deal with the passenger traffic in connection with the new aerodrome and R.A.F. cadets' school.

Newport, East Usk Branch.—A system of control by telephones and stop lamps is to be introduced in lieu of the present method of train-staff working, to permit of more than one engine being on the branch at a time. This provision has become essential owing to the additional traffic arising from the opening of the British Aluminium Company's new factory on the branch.

Reading.—In order to assist the work of the signalmen in the West Main and West Junction boxes, track circuiting is to be provided at the junctions of the locomotive depot lines with the running lines.

St. Erth.—The parcels office is to be extended and a ramp provided between the branch platform and the up main line platform.

Swindon Works.—The plant for the manufacture and maintenance of coupling rods, valve gear, &c., in "A" Shop is to be rearranged so that the work may be carried out with greater facility.

The Alliance automatic couplers fitted to the new 2-10-4 South African Railways locomotive described in last week's issue were supplied by the English Steel Corporation Limited, who are the licensees in this country for these couplers.

Boilers Required for India

Tenders are invited by the Agent, Great Indian Peninsula Railway, receivable in India by February 11, for the supply of five locomotive boilers, H.S. 12 type for H/4 engines. Firms desirous of offering boilers of United Kingdom manufacture can obtain further details from the Department of Overseas Trade.

Steel Bogie Wagons Required for South Africa

The South African Railways & Harbours Administration is calling for tenders (No. 1546) for the supply and delivery of 500, or, alternatively, 1,000, drop-sided steel bogie wagons, type DZ-7, load 84,000 lb., coal load 76,000 lb., 3 ft. 6 in. gauge. Tenders, endorsed "Tender No. 1546, 500 or 1,000 Type DZ-7 Wagons," should reach the Secretary to the Tender Board, South African Railways & Harbours Headquarters Office, Johannesburg, by March 14. A copy of the specifications and general conditions of tender may be borrowed from the Department of Overseas Trade, London, S.W.1. Local representation is essential.

Steel Bridgework Required for South Africa

The South African Railways & Harbours Administration is calling for tenders (Tender No. 1614) for the supply and delivery of approximately 233 tons of steelwork, together with quantities of rivets, bolts, and nuts for bridges. Tenders, endorsed "Tender No. 1614 for Bridgework," should reach the Secretary to the Tender Board, South African Railways & Harbours, Headquarters Office, Johannesburg, by March 14. A copy of the schedule of requirements, specification and general conditions of contract, together with drawings, may be borrowed from the Department of Overseas Trade, London, S.W.1. Local representation is essential.

Tenders are invited, receivable by the Controller of Stores, North Western Railway of India, Lahore, by February 2, for the supply of 1,770 sets of combination fishplates.

The statement made in this column last week that Vulcan-Sinclair fluid couplings had been ordered to replace Leyland torque converters in railcars belonging to the New Zealand Government Railways is incorrect. The seven traction-type couplings actually ordered from the Hydraulic Coupling & Engineering Co. Ltd. by the Drewry Car Co. Ltd. are for installation in the seven Leyland-engined 0-6-0 locomotives for New Zealand, the order for which was recorded on p. 38 of last week's issue.

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LEGAL AND OFFICIAL NOTICES

In the Court of the Railway Rates Tribunal.

Road and Rail Traffic Act, 1933

Agreed Charges

NOTICE IS HEREBY GIVEN that Applications for the approval of Agreed Charges under the provisions of Section 37 of the Road and Rail Traffic Act, 1933, short particulars of which are set out in the Schedule hereto, have been lodged with the Railway Rates Tribunal.

The Procedure to be followed in regard to the inspection of the said Applications and the filing of Notices of Objections is that published in the *London Gazette* of 28th July, 1936.

Printed copies of the Procedure can be obtained from the Railway Rates Tribunal, Bush House, Aldwych, London, W.C.2.

Notices of Objection to any of the said Applications must be filed on or before the 1st February, 1938.

A copy of each Application can be obtained from Mr. G. Cole Deacon, Secretary, Rates and Charges Committee, Fielden House, Great College Street, Westminster, London, S.W.1, price 1s. post free.

T. J. D. ATKINSON,
Registrar.

10th January, 1938

Number of Application	Name of Trader and General Description of Traffic
1937—No. 720	WOOLEY SANDERS & CO. LTD., 72, 74, Wood Street, London, E.C.2; Hats, Millinery, etc.
1937—No. 721	BRADFIELD, IBBERSON & CO. LTD., King's Lynn, Norfolk; Clothing, etc.
1937—No. 722	BRITISH SALES LIMITED (DISTRIBUTORS), Adelaide House, King William Street, London, E.C.4; Preserves.
1937—No. 723	NORTHERN ALUMINIUM CO. LTD., Bush House, Aldwych, London, W.C.2; Aluminium, etc. *Applicable also to traffic consigned by one Associated or Subsidiary Company.*
1937—No. 724	PAUL WALSER & CO. LTD., Reslaw House, Great Marlborough Street, London, W.1; Hats, Millinery, etc.
1937—No. 725	I. E. TRENT & CO. LTD., 10, Oat Lane, Wood Street, London, E.C.2; Textiles.
1937—No. 726	LEAR, BROWNE & DUNSFORD, Exeter; Clothing, Drapery, etc.
1937—No. 727	BALLITO HOSIERY MILLS LIMITED, Hatfield Road, St. Albans; Hosiery, etc.
1938—No. 1	WM. FRANK (1932) LIMITED, Wood Street Bridge, Cardiff; Confectionery.
1938—No. 2	ROBERT H. HALL & CO. (KENT) LTD., Paddock Wood, Kent; Portable Houses, etc.
1938—No. 3	RICHARD RICHMOND LIMITED, Albert Factory, Gamble Street, Nottingham; Hosiery.
1938—No. 4	S. & J. WATTS & CO., Manchester; Textiles, etc.
1938—No. 5	A. WELLS & CO. LTD., 23A, White Street, Moorfields, London, E.C.2; Toys, etc. *Applicable also to traffic consigned by one Associated or Subsidiary Company.*
1938—No. 6	B. BEDDOW & SONS LTD., Battersea Park Road, London, S.W.11; Polishes, Boot Brushes, etc.
1938—No. 7	THE BRITON BRUSH CO. LTD., Wymondham, Norfolk; Brushes, etc.
1938—No. 8	GEO. T. COX & SONS LTD., 31, King William Street, London, E.C.4; Groceries, Preserves and Provisions, etc.
1938—No. 9	J. C. & J. FIELD LIMITED, 15, Upper Marsh, Lambeth, London, S.E.1; Soap, Candles, Druggists' Sundries, Groceries, etc.
1938—No. 10	FOSTER CLARK LIMITED, Maidstone; Confectionery, Groceries, Preserves, etc.
1938—No. 11	THE GENERAL UTILITY CO. LTD., 71, Craigton Road, Govan, Glasgow, S.W.1; Ice Cream Freezing Machines, etc.
1938—No. 12	GERARD BROS. LTD., The Soap Works, Wilkinson Street, Nottingham; Soap, Toilet Preparations, etc.
1938—No. 13	HORLICKS LIMITED, Slough; Malted Milk, etc.
1938—No. 14	HUGON & CO. LTD., Ogden Lane, Openshaw, Manchester; Suet, Lard, Tinned Fruits, etc.
1938—No. 15	LAWLEYS LIMITED, 36, Golden Square, London, W.1; China, Earthenware, etc.
1938—No. 16	LAWLEYS LIMITED, 36, Golden Square, London, W.1; Earthenware, ex Hanley, Longton and Tunstall.
1938—No. 17	MANBRE & GARTON LIMITED, Winslow Road, Hammersmith, London, W.6; Brewers' Sugar, etc.
1938—No. 18	MARS CONFECTIONS LIMITED, Trading Estate, Slough; Confectionery.
1938—No. 19	MAYNARDS LIMITED, Vale Road, Finsbury Park, London, N.4; Confectionery, etc.
1938—No. 20	WM. O'HANLON & CO. LTD., 49 and 51, Dale Street, Manchester; Cotton and Linen Goods, etc.
1938—No. 21	JOHN PATERSON & CO. LTD., Clensel Works, Orr Street, Glasgow; Ammoniated Liquid Soap and Ammonia Solution.
1938—No. 22	JOHN PATERSON & CO. LTD., Clensel Works, Orr Street, Glasgow; Empties returned to the Trader.
1938—No. 23	R. ROWLEY & CO. LTD., Queen Street, Leicester; Hosiery.
1938—No. 24	THE SCOTTISH CO-OPERATIVE WHOLESALE SOCIETY, LIMITED, Kilmarnock; Live Pigs.
1938—No. 25	THE SOUTH WALES SACK AND BAG CO. LTD., Dumballs Road, Cardiff; Sacks, Sacking, Twine and Paper Bags.
1938—No. 26	SPILLERS LIMITED, 40, St. Mary Axe, London, E.C.3; Dog Biscuits, Bird Seed, etc., ex Cardiff.
1938—No. 27	SPILLERS LIMITED, 40, St. Mary Axe, London, E.C.3; Dog Biscuits, Bird Seed, etc., ex London.
1938—No. 28	JOHN WALLACE & CO. LTD., Rowallan Creamery, Kilmarnock; Butter.
1938—No. 29	ANGUS WATSON & CO. LTD., Southall, Middlesex; Groceries, Preserves and Provisions, etc.
1938—No. 30	ANGUS WATSON & CO. LTD., Southall, Middlesex; Groceries, Preserves and Provisions, etc. *Applicable to traffic consigned by two Associated or Subsidiary Companies.*
1938—No. 31	ANGUS WATSON & CO. LTD., Southall, Middlesex; Groceries, Preserves and Provisions, etc., ex Newcastle-on-Tyne.
1938—No. 32	H. C. WEBB & CO. LTD., Tame Road, Witton, Birmingham; Machines, Lawn-mowing, Washing and Wringing, etc.
1938—No. 33	H.M. OFFICE OF WORKS, SUPPLIES DIVISION, King Charles Street, Whitehall, London, S.W.1; Furniture, etc.
1938—No. 34	CARRERAS LIMITED, Arcadia Works, Hampstead Road, London, N.W.1; Manufactured Tobacco, etc.
1938—No. 35	F. W. WOOLWORTH & CO. LTD., New Bond Street House, 1/5, New Bond Street, London, W.1; All Goods for sale or use at the Trader's Stores, with certain exceptions.
1938—No. 36	PREMIER YEAST CO. LTD., Long Drive, Greenford, Middlesex; Yeast.
1938—No. 37	THE UTILUS COAT CO. LTD., Hillidge Road, Hunslet, Leeds, 10; Clothing.
1938—No. 38	JAMES AIKMAN & SONS, 43/53, Jeffrey Street, Edinburgh; Boots and Shoes.
1938—No. 39	B.S.A CYCLES LIMITED, Birmingham; Motor Bicycles.
1938—No. 40	J. H BOUNDS, Stethos House, 68, Sackville Street, Manchester; Cotton, Linen and Woollen Goods.
1938—No. 41	BRITISH STEAM SPECIALITIES LIMITED, Fleet Street, Leicester; Machinery Parts, etc.
1938—No. 42	MONTAGUE BURTON LIMITED, Hudson Road Mills, Leeds, 9; Clothing.
1938—No. 43	DOMINION DAIRY CO. LTD., Aylesbury, Bucks; Butter and Cheese.
1938—No. 44	SAMUEL DRIVER LIMITED, Marshall Street, Leeds, 11; Clothing, etc.
1938—No. 45	DRYAD LIMITED, 42, Saint Nicholas Street, Leicester; Cane Work, Plywood, etc.
1938—No. 46	ALFRED E. JONES LIMITED, 32, 35 and 502, St. John's Market, Liverpool; Meat, Meat Pies and Sausages, etc.
1938—No. 47	MALGA (LONDON) LIMITED, Southall, Middlesex; Bakers' Filling Cream.
1938—No. 48	JOHN MYERS & CO. LTD., Westminster Bridge Road, London, S.E.; Clothing, etc.
1938—No. 49	S. SIMPSON LIMITED, 92–100, Stoke Newington Road, London, N.16; Clothing, etc. *Applicable also to traffic consigned by one Associated or Subsidiary Company.*
1938—No. 50	JAS. SMITH & SONS (CLEANERS) LTD., The Dye Works, Dewsbury; Dyed and Cleaned Goods, etc.
1938—No. 51	TURNBULL & STOCKDALE LIMITED, Rosebank Print Works, Ramsbottom; Textiles.
1938—No. 52	A. GOLDENFELD & CO. LTD., 101, High Street, Whitechapel, London, E.1; Boots, Shoes, etc.
1938—No. 53	BEATTIES BISCUITS LIMITED, Drumschapel, Glasgow; Biscuits and Cakes.
1938—No. 54	BOOTH'S DISTILLERIES LIMITED, 83, 84 and 85, Turnmill Street, London, E.C.1; Wines and Spirits, etc.
1938—No. 55	DUTFIELD & QUAYLE LIMITED, Franchise Street, Kidderminster; Carpets, etc.
1938—No. 56	T. W. HUDSON & SONS, 11, Wharf Street, Stockton-on-Tees; Joinery Work. *Applicable also to traffic consigned by one Associated or Subsidiary Company.*
1938—No. 57	PIRIE APPLETON & CO. LTD., Aldgate House, 46–58, Mansell Street, London, E.1; Paper, etc., ex Ilford and London Goods Stations. *Applicable also to traffic consigned by one Associated or Subsidiary Company.*
1938—No. 58	VALENTINE & SONS LTD., Westfield Works, Dundee; Calendars, Pictures Framed, Stationery, Fancy Goods, etc.
1938—No. 59	WESTERN MARGARINE LIMITED, Western Avenue, Acton, London, W.4; Margarine, etc.
1938—No. 60	W. BARRATT & CO. LTD., Footshape Works, Northampton; Boots and Shoes, etc.
1938—No. 61	HORLICKS LIMITED, Slough; Malted Milk, etc.
1938—No. 62	SUNDERLAND & SONS LTD., 4, Darnley Street, Glasgow; Clothing, etc.
1938—No. 63	HERBERT J. COLCLOUGH, Vale Works, Goddard Street, Longton, Stoke-on-Trent; Pottery.
1938—No. 64	WHYTE, RIDSDALE & CO. LTD., 74, 75 and 76, Houndsditch, Bishopsgate, London, E.C.3; General Stores Wares, etc. *Applicable also to traffic consigned by one Associated or Subsidiary Company.*
1938—No. 65	KIMBERLIN, BROWN & CO. LTD., "Kay Bee" House, Charles Street, Leicester; Ladies' Outwear and Underwear, etc.
1938—No. 66	POLIKOFF LIMITED, 31–51, Chatham Place, London, E.9; Clothing. *Applicable also to traffic consigned by one Associated or Subsidiary Company.*
1938—No. 67	THE DISTRIBUTORS AND TRANSPORTERS LIMITED (MESSRS. LEVER BROS. & UNILEVER LIMITED, DISTRIBUTING ORGANISATION), Unilever House, Blackfriars, London, E.C.4; Soap, etc., ex Bricklayer's Arms, Nine Elms, Hounslow and Brentford. *Applicable to traffic consigned by thirty-six Associated or Subsidiary Companies.*
1938—No. 68	THE DISTRIBUTORS AND TRANSPORTERS LIMITED (MESSRS. LEVER BROS. & UNILEVER LIMITED, DISTRIBUTING ORGANISATION), Unilever House, Blackfriars, London, E.C.4; Soap, etc., ex Dover, Shoreham, Portsmouth, Southampton and Poole. *Applicable to traffic consigned by three Associated or Subsidiary Companies.*
1938—No. 69	THE DISTRIBUTORS AND TRANSPORTERS LIMITED (MESSRS. LEVER BROS. & UNILEVER LIMITED, DISTRIBUTING ORGANISATION), Unilever House, Blackfriars, London, E.C.4; Candles, Soap, ex Bristol. *Applicable to traffic consigned by five Associated or Subsidiary Companies.*

Legal and Official Notices—*(continued)*

THE MADRAS & SOUTHERN MAHRATTA RAILWAY COMPANY LIMITED invite Tenders for :—

150 STEEL TYRES FOR LOCOMOTIVES (60 METRE GAUGE AND 90 BROAD GAUGE).

Specification and Form of Tender can be obtained at the Company's Offices, 123, Victoria Street, Westminster, London, S.W.1.

Fee 10s. 6d., *which will not be returned.*

Tenders must be submitted not later than 2 o'clock p.m. on TUESDAY, 1ST FEBRUARY, 1938.

The Directors do not bind themselves to accept the lowest or any Tender and reserve to themselves the right of reducing or dividing the order.

By Order of the Board,
G. W. V. DE RHE PHILIPE,
Secretary.

Bengal-Nagpur Railway Company Limited

THE Directors are prepared to receive Tenders for :—

800 DRAWBARS.

Specification and Form of Tender can be obtained at the Company's Offices, 132, Gresham House, Old Broad Street, London, E.C.2, on or after 10th January, 1938.

A fee of 10s. will be charged for each copy of the Specification, which is *NOT* returnable.

Tenders must be submitted not later than Noon on Wednesday, 19th January, 1938.

The Directors do not bind themselves to accept the lowest or any Tender, and reserve to themselves the right of reducing or dividing the order.

By Order of the Board,
T. R. WYNNE,
Managing Director.

Universal Directory of Railway Officials and Railway Year Book

43rd Annual Edition, 1937-38

This unique publication gives the names of all the principal railway officers throughout the world, together with essential particulars of the systems with which they are connected. Much general and statistical information about railways is also concisely presented.

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Telegraph Cables over the Forth Bridge

After the laying of two submarine cables across the River Tay, forming part of the new main Aberdeen-Edinburgh carrier scheme, the cables have now been carried over the Firth of Forth on the Forth bridge. The submarine location on the sand and mud of the Tay could not be repeated in the Forth, with its rocky and boulder-strewn bed, and there was nothing for it but to use the bridge. The work comprised the installation of the two carrier cables referred to together with three other cables, the latter being replacements of old cables deteriorated through the excessive vibration and the expanding and contracting movements of the bridge. Work was begun in December, 1936, and was terminated on May 1, 1937. By arrangement with the Forth Bridge Railway Company's maintenance department, rigging and fitting staff carried out most of the auxiliary work and the actual laying was done on Sundays, by means of a ballast train. The drums of cable were received at South Queensferry station where they were reloaded on low-sided plate wagons, ready for paying off, and shunted to Dalmeny sidings to await the appointed time for placing. The experience gained on the first two Sundays proved invaluable for the placing of the carrier cables, which was carried out during a 60 m.p.h. gale on the third Sunday. As the drums were emptied they were turned over and battened down to the floor of the wagons as a precaution against blowing off on to the opposite line, where single line working was in operation. Unfortunately, bad weather predominated during much of the work of installation, and special precautions had to be taken for the safety of the staff engaged in exposed positions, especially in the laying of the cables on the bridge itself, at 160 ft. above the water. Altogether 68 lengths of cable, ranging in length from 25 to 312 yards, were installed on the bridge, giving an overall length of approximately 7¼ miles. The joints numbered 86, of which 46 were of the normal type and the remaining 40 plug joints.* A very important part of the installation work was the bedding of the cables in the main trough with a special compound as a protection against damage by rubbing caused through the almost constant vibration set up by passing trains. This compound, of which the main constituent is French chalk, is made plastic by heating, for which the railway company allowed no more than six braziers to be in use at the same time, a special type of heater being used to avoid danger to the bridge and to passing trains. The total quantity of compound used in the 1,800 yards of trough was 35 tons and this, in 1 cwt. drums, together with 14 tons of coke and coal and firewood, was taken out from Dalmeny sidings on a Sunday afternoon and distributed on the six-foot way along the length of the trough. According to the *Standard News*, the Standard Telephones and Cables Limited employees' monthly magazine, to which we are indebted for the foregoing description, the Forth Bridge installation is the most "eccentric" cable job the Standard Company has so far been called upon to undertake.

* Much of the fitting work was done in the railway company's workshop.

Forthcoming Events

Jan. 14 (*Fri.*).—Institute of Transport (Manchester-Liverpool), at Grand Hotel, Manchester. Annual Dinner.

Institute of Transport (Newcastle), at Royal Station Hotel, 7.30 p.m. "Goods Traffic by Rail," by Mr. G. Atkinson.

Institute of Transport (Newcastle Graduate), at Royal Station Hotel, 6 p.m. "Coal Shipments," by Mr. A. Earley.

Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, 6.30 p.m. "Modern Tendencies in the Design of Small Tools and Turret Lathe Tools," by Mr. E. Tipple.

Jan. 17 (*Mon.*).—Engineers' German Circle, at Inst. of Mechanical Engineers, Storey's Gate, London, S.W.1, 6 p.m. "Diesel Locomotives with Direct Drive," by Dr.-Ing. Finsterwalder.

Jan. 18 (*Tues.*).—Institute of Metals (Birmingham), at James Watt Inst., 7 p.m. "Creep of Metals at High Temperatures," by Mr. R. Bailey.

Institute of Transport (Leeds Graduate), at City Transport Department, 7 p.m. "Road Passenger Transport: The Relationship between Municipal and Private Enterprise," by Mr. A. Stone.

Institute of Transport (London) at Inst. of Electrical Engineers, Savoy Place, W.C.2, 6 p.m. "The Place of the User in Co-ordination," by Mr. H. Crane.

Institute of Welding (London), at Inst. of Mechanical Engineers, Storey's Gate, S.W.1, 6.30 p.m. "The Measurement of Residual Stresses by X-Ray Methods," by Mr. R. Stephens.

Institute of Welding (Tyneside), at Armstrong College, Newcastle, 7.30 p.m. "Residual Stress Investigations," by Mr. H. Martin.

Institution of Electrical Engineers (Scottish Students), at Heriot Watt College, Chambers Street, Edinburgh, 7.15 p.m. "Electricity in Railway Signalling," by Mr. J. Wooldridge.

Permanent Way Institution (Brighton), at Welfare Room, New England Street, 7 p.m. "Gauge Clearances," by Mr. F. Gill.

Jan. 20 (*Thurs.*).—G.W.R. (London) Lecture and Debating Society, at General Meeting Room, Paddington Station, 5.45 p.m. Reading of Prize Essay: "The Case for a Research Department in Railway Business."

Institution of Electrical Engineers (Scottish Students), at Royal Technical College, George Street, Glasgow, 7.30 p.m. "Electricity in Railway Signalling," by Mr. J. Wooldridge.

Institution of Locomotive Engineers (Scottish), at Royal Technical College, George Street, Glasgow, 7.30 p.m. "Speed Indicators and Recording Apparatus," by Mr. W. Skinner.

Permanent Way Institution (Nottingham-Derby), at Bridgeway Hall, Nottingham, 7.15 p.m. "Welded Rail Joints," by Mr. T. Somerville.

Jan. 21 (*Fri.*).—Institute of Transport (East Midlands), at Guildhall, Nottingham, 7 p.m. "The Reason Chesterfield Corporation changed over from Trolleybus to Oil Engined Buses," by Mr. R. Hoggard.

Institute of Welding (Midlands), at James Watt Inst., Newhall Street, Birmingham, 7.30 p.m. "Nickel Alloys," by Mr. N. Marples.

Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, 6 p.m. "Machine Tool Tests and Alignments," by Prof. Dr.-Ing. G. Schlesinger.

Jan. 22 (*Sat.*).—Institute of Welding (South Wales), at Technical College, Newport, 7.30 p.m. "The Application of Surfacing Metals by Oxy-Acetylene," by Mr. C. Bainbridge.

Permanent Way Institution (Exeter), at Mead Street Hall, Bristol, 2.45 p.m. "Permanent Way for High Speed," by Mr. W. A. Willox.

XUM

Railway Share Market

Sentiment in the stock and share markets has benefited from the stronger trend of Wall Street and from the partial rally in commodity and metal prices resulting from better advices regarding trade conditions in the United States. Home railway stocks moved against the general market tendency earlier in the week, but very little selling pressure was reported. The less hopeful views with regard to the forthcoming dividends, now generally current in the market, led to decreased demand, but on Wednesday the lower prices attracted attention and there was some recovery. This was due partly to satisfaction with the past week's traffics, but also to the possibility that, as was the case with the interim statements, the market may be taking a too pessimistic opinion of the net receipts for the whole of 1937. It is impossible to estimate the probable rise in expenses of individual companies in the past year, and the rate of increase may be considerably lower in some cases than in others.

The disposition in the market is now to budget for a dividend of 1½ per cent. on L.M.S.R. ordinary; 1¼ per cent. on L.N.E.R. second preference; and for ¾ per cent. on Southern deferred. In the case of Great Western 3½ per cent., or possibly more, is looked for, although it is recognised that the decision will turn on whether it is intended to add to reserves, which were drawn on in the past in order to maintain dividends of 3 per cent. on the ordinary stock. The past week's traffics were considered quite satisfactory in view of the fact that comparison is now with 1937, when receipts were at a good level.

L.M.S.R. ordinary is lower on balance at 28⅜, but shows fractional improvement over the lowest price touched this week. Great Western made good recovery from a previous decline, and was subsequently active at 61½. L.N.E.R. second preference was relatively steady at 26, as was Southern deferred around 19¼. The preferred stock of the latter railway was later more active up to 85¼. Junior preference stocks generally were out of favour, although on Wednesday L.M.S.R. 4 per cent. and 1923 preferences were firmer at 81 and 68½ respectively.

Argentine railway ordinary and preference stocks have not kept best prices, but the debentures were steadier. San Paulo ordinary was marked down heavily to 50 on uncertainty as to how the railway will be affected by the latest Brazilian exchange regulations; Leopoldiana issues also reacted. United of Havana 5 per cent. debentures improved to 9 on the better traffic outlook. Beira Railway shares were firm on the dividend, while Canadian Pacific were again better in sympathy with the trend of American railway stocks.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1937–38	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1937	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1937	Prices: Lowest 1937	Prices: Jan. 12, 1938	Yield% (See Note)
				£	£		£	£	£					
South & Central America	Antofagasta (Chili) & Bolivia	834	9.1.38	16,489	+ 2,320	2	17,080	16,530	+ 550	Ord. Stk.	29	10¼	13	Nil
	Argentine North Eastern	753	8.1.38	8,883	+ 1,278	28	267,465	254,993	+ 12,472	,,	19¼	6	5½	Nil
	Argentine Transandine	—	—	—	—	—	—	—	—	A. Deb.	93½	60	80	5
	Bolivar	174	Dec., 1937	3,900	— 1,700	52	59,550	74,200	— 14,650	6 p.c. Deb.	9½	5	8½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	17	9	11½	45 6
	Buenos Ayres & Pacific	2,806	8.1.38	83,899	— 16,811	28	2,224,258	2,221,444	+ 2,814	Ord. Stk.	17⅛	5½	6½	Nil
	Buenos Ayres Central	190	25.12.37	$95,300	— $43,500	26	$3,329,300	$3,697,206	— $367,900	Mt. Deb.	41½	18	22½	Nil
	Buenos Ayres Gt. Southern	5,084	8.1.38	186,223	— 13,834	28	3,591,439	3,377,996	+ 213,443	Ord. Stk.	33¾	13½	16	Nil
	Buenos Ayres Western	1,930	8.1.38	42,681	— 19,975	28	1,249,852	1,229,793	+ 40,059	,,	31¾	11¼	12	Nil
	Central Argentine	3,700	8.1.38	111,517	— 47,100	28	3,538,704	3,943,951	— 405,247	,,	34¼	10¾	12	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	20½	4½	6	Nil
	Cent. Uruguay of M. Video	980	1.1.38	23,284	+ 2,171	27	452,538	448,649	+ 3,889	Ord. Stk.	67/32	2	2¼	Nil
	Cordoba Central	1,218	8.1.38	24,190	— 12,040	28	845,620	908,180	— 62,560	Ord. Inc.	6¼	1½	2	Nil
	Costa Rica	188	Nov., 1937	22,336	+ 2,714	22	123,362	91,581	+ 31,781	Stk.	38	27	28½	7
	Dorada	70	Nov., 1937	15,800	+ 1,000	48	170,100	156,500	+ 13,600	1 Mt. Db.	107	106	107½	5 9/16
	Entre Rios	810	8.1.38	18,548	+ 5,192	28	386,833	359,812	+ 27,027	Ord. Stk.	19 7/16	6	6½	Nil
	Great Western of Brazil	1,092	8.1.38	9,100	— 700	2	9,600	11,400	— 1,800	Ord. Sh.	5/4	1/8	3/8	Nil
	International of Cl. Amer.	794	Nov., 1937	$503,126	+ $82,245	48	$5,379,250	$4,650,651	+ $728,599	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	2/-	1/-	1/2	Nil
	La Guaira & Caracas	22¾	Dec., 1937	4,890	— 1,335	52	61,575	56,700	+ 4,875	Stk.	8½	6	8½	Nil
	Leopoldina	1,918	8.1.38	18,061	— 2,559	2	20,070	23,409	— 3,339	Ord. Stk.	9¼	3	3⅝	Nil
	Mexican	483	7.1.38	$208,600	— $24,600	1	$208,600	$233,200	— $24,600	,,	1½	¼	½	Nil
	Midland of Uruguay	319	Nov., 1937	9,439	+ 421	22	42,148	41,315	+ 832	,,	1⅞	½	½	Nil
	Nitrate	384	31.12.37	9,351	+ 2,446	52	154,113	119,211	+ 34,902	Ord. Sh.	3 1/16	2	2 5/16	Nil
	Paraguay Central	274	8.1.38	$2,781,000	+ $218,000	28	$90,140,000	$72,337,000	+ $17,803,000	Pr. Li. Stk.	84	79¼	77½	7¾
	Peruvian Corporation	1,059	Dec., 1937	76,908	— 4,604	26	504,036	490,785	+ 13,251	Pref.	14⅝	4½	5	Nil
	Salvador	100	1.1.38	¢27,250	+ ¢1,850	27	¢388,375	¢385,758	+ ¢2,617	Pr. Li. Db.	23½	21½	22½	Nil
	San Paulo	153½	2.1.38	26,927	— 2,774	1	26,927	29,701	— 2,774	Ord. Stk.	98½	56	49½	10⅛
	Taltal	160	Dec., 1937	6,185	+ 2,095	26	22,535	29,900	+ 1,635	Ord. Sh.	17 1/16	11/16	5/4	13 5/16
	United of Havana	1,353	8.1.38	19,709	+ 3,324	28	462,430	443,299	+ 19,131	Ord. Stk.	55/8	51/32	2	Nil
	Uruguay Northern	73	Nov., 1937	921	— 362	22	4,320	5,055	— 735	Deb. Stk.	10	2	3½	Nil
Canada	Canadian National	23,803	7.1.38	543,952	— 39,144	1	543,952	583,096	— 39,144	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	— 4 p.c.	Perp. Dbs.	77	62½	67½	5 15/16
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	101 7/8	94½	100	4
	Canadian Pacific	17,186	7.1.38	457,600	+ 9,000	1	457,600	448,600	+ 9,000	Ord. Stk.	18	7¼	8	Nil
India†	Assam Bengal	1,329	10.12.37	35,715	— 2,423	36	942,780	905,828	+ 36,951	Ord. Stk.	86	73½	80	3¾
	Barsi Light	202	10.12.37	2,947	+ 315	36	90,150	80,798	+ 9,352	Ord. Sh.	66½	46	54	9¼
	Bengal & North Western	2,107	2.12.37	76,497	— 186	12	598,071	603,618	— 5,547	Ord. Stk.	317	301	307	5⅞
	Bengal Dooars & Extension	161	2.12.37	3,430	— 252	38	108,419	97,567	+ 10,852	,,	100	84	86½	7
	Bengal-Nagpur	3,268	2.12.37	193,125	+ 33,175	38	4,932,124	4,364,296	+ 567,828	,,	101	89	90½	4 7/16
	Bombay, Baroda & Cl. India	3,072	31.12.37	278,325	— 49,725	39	6,532,125	6,292,200	+ 239,925	,,	113	110½	111½	5⅝
	Madras & Southern Mahratta	3,229	2.12.37	158,100	— 19,579	38	3,919,184	3,900,467	+ 18,717	,,	110	105	107½	7 15/16
	Rohilkund & Kumaon	572	20.12.37	14,542	— 64	12	101,151	104,901	— 3,750	,,	314	302	307	5 11/16
	South Indian	2,531¼	2.12.37	119,581	+ 14,398	38	2,990,652	2,880,058	+ 110,594	,,	103½	99½	100½	4¾
Various	Beira-Umtali	204	Oct., 1937	95,714	+ 27,209	5	95,714	68,505	+ 27,209	—	—	—	—	—
	Egyptian Delta	620	10.12.37	7,900	— 311	36	183,881	174,138	+ 9,743	Prf. Sh.	31/-	5/4	11/4	Nil
	Great Southern of Spain	—	—	—	—	—	—	—	—	Inc. Deb.	3½	1/8	3½	Nil
	Kenya & Uganda	1,625	Nov., 1937	210,808	+ 19,924	48	2,514,047	2,321,904	+ 192,143	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	48 1/8	43½	45½	8¾
	Midland of W. Australia	277	Nov., 1937	14,455	+ 1,259	22	69,130	67,251	+ 1,879	Inc. Deb.	98	93½	93½	4¼
	Nigerian	1,900	27.11.37	95,792	+ 7,288	35	1,725,735	1,339,381	+ 386,354	—	—	—	—	—
	Rhodesia	2,451	Oct., 1937	467,363	+ 112,132	5	467,363	355,231	+ 112,132	—	—	—	—	—
	South Africa	13,263	25.12.37	660,943	+ 51,163	39	25,050,223	23,593,175	+ 1,457,048	—	—	—	—	—
	Victoria	4,774	June, 1937	793,223	+ 89,530	52	10,135,291	9,689,925	+ 445,366	—	—	—	—	—
	Zafra & Huelva	112	Sept., 1937	15,307	+ 8,641	39	117,046	65,948	+ 51,098	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16.

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend.

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements are based on the current rates of exchange and not on the par value.